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FACTORS AFFECTING CALIFORNIA RAISIN SALES AND PRICES, 1922-1929¹

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At what price can the tonnage of California raisins available during any particular marketing season be sold? As important as this question obviously is to those producing and marketing California raisins, many of the basic data needed in its solution were unavailable until July, 1930. At that time, however, through the cooperation of the members of the Dried Fruit Association of California, the independent packers of the state, and the Sun-Maid Raisin Growers Association, records of the quantities of California raisins sold for the crop years 1921-1929 and of the actual f.o.b. prices received were made available to the Giannini Foundation. Together with other more readily available information these data have been used as the basis of the present attempt to discover and measure the influence of the factors that have determined the quantities of California raisins sold annually in the domestic and in the overseas markets during the last eight marketing seasons, 1922-1929.

Although the analysis explains only what has occurred in the past, much of its value obviously lies in the help it can give the industry in judging the price at which any given tonnage may be expected to sell during any given crop year in the future. In fact, the specific reason for undertaking the study in the spring of 1930 was to make available a better basis for such judgment in the proposed control program of the industry.

¹ Paper No. 20, The Giannini Foundation of Agricultural Economics. This study was made with the financial cooperation of the Federal Farm Board.

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CALIFORNIA RAISIN SALES

Within a decade California raisin production has nearly doubled. As a consequence the industry has experienced drastic price declines. Production averaged about 285,000 tons during the years 1926, 1927, and 1928, or over 100,000 tons more than the average at the close of the War.

TABLE 1

COMPLETED SALES OF CALIFORNIA RAISINS BY COUNTRIES, 1921-1929*

Year beginning Sept. 1	Grand total	Domestic			Exports			
		Total, U. S. and Canada	United States	Canada	Total		United Kingdom	Other countries
					Including Canada	Excluding Canada		
Nearest hundred short tons, sweat-box basis*								
	1	2	3	4	5	6	7	8
1921.....	155,000	139,700	125,200	14,500	29,800	15,300	11,000	4,300
1922.....	190,000	153,500	135,000	18,500	55,000	36,500	20,400	16,000
1923.....	195,000	168,400	149,400	19,000	45,600	26,600	8,300	18,300
1924.....	220,000	187,600	167,600	20,000	53,000	32,400	14,800	17,600
1925.....	240,000	185,300	168,000	17,300	72,000	54,700	23,800	30,900
1926.....	245,000	182,400	162,300	20,100	82,700	62,600	28,500	34,100
1927.....	285,000	199,600	178,000	21,600	107,000	85,400	37,700	47,700
1928.....	290,000	193,400	171,000	22,400	119,000	96,600	37,000	59,600
1929.....	215,000	162,800	148,500	14,300	66,500	52,200	19,100	33,100

* Sales have been converted to a sweat-box basis by multiplying the net weight of packed raisins as sold by 1.08 or the gross shipping weight as reported by the carriers by 0.933. A wooden box of 25 pounds net weight of Thompson Seedless raisins weighs approximately 29 pounds gross (see Calpak Annual, July, 1930. p. 17). Sales through by-products channels and to other packers are excluded from these data.

Sources of data:

Col. 1: Total sales are based largely upon records of shipments of raisins from California by rail and intercoastal water as reported by carriers, and by direct export to foreign countries from the San Francisco and the Los Angeles customs districts, plus estimated California consumption based on per capita consumption in the rest of the United States. Reported shipments, however, have been checked against completed sales compiled by the Giannini Foundation from records of the Sun-Maid Raisin Growers Association and summarized sales of other raisin packers furnished by the Dried Fruit Association of California through the cooperation of its members.

Col. 2: Sum of items for corresponding years in cols. 3 and 4.

Col. 3: Items in col. 1 minus the items for corresponding years in col. 5.

Cols. 4, 5, 6, 7, 8: Compiled from U. S. Monthly Summary of Foreign Commerce. Net weight converted to approximate sweat-box basis by multiplying by 1.08.

In spite of the great decline in prices and the diversion of a considerable tonnage into by-products (alcohol, syrup and stock feed), the September 1 raisin carryover in the state has been in the neighborhood of 100,000 tons for the last four years (see table 3). Prices have not been low enough since 1920 to move all of the available supply for any crop year into consumption.

TABLE 2
PERCENTAGE OF CALIFORNIA RAISIN PRODUCTION BY VARIETIES, 1921-1930

Crop year	Total	Thompson Seedless	Muscat	Sultana	Others*
1921.....	100.0	49.1	38.8	8.9	3.2
1922.....	100.0	55.6	34.8	7.4	2.2
1923.....	100.0	60.7	30.6	7.5	1.2
1924.....	100.0	64.8	27.4	7.0	0.8
1925.....	100.0	77.0	14.9	6.4	1.7
1926.....	100.0	69.3	22.8	5.8	2.1
1927.....	100.0	71.4	22.0	5.2	1.4
1928.....	100.0	79.5	13.0	5.3	2.2
1929.....	100.0	73.7	20.3	4.3	1.7
1930.....	100.0	73.7	21.4	4.0	0.9

* "Others" may include some soda and oil-dipped Sultanas and Thompson Seedless.

Sources of data:

Computed from the total of Sun-Maid and packer receipts by variety as reported to the Giannini Foundation except 1930 data, which are based on receipts of the California Raisin Pool to February 28, 1931.

TABLE 3
UNSHIPPED STOCKS OF CALIFORNIA RAISINS IN THE HANDS OF SUN-MAID
AND INDEPENDENT PACKERS ON SEPTEMBER 1, SOLD AND UNSOLD,
SHORT TONS, SWEAT-BOX BASIS, 1921-1930*

Year	Total	Thompson Seedless	Muscat	Other varieties
1921.....	36,000	5,200	22,600	8,200
1922.....	34,000	9,400	19,500	5,100
1923.....	86,000	40,900	40,300	4,800
1924.....	186,000	107,300	64,500	16,200
1925.....	67,000	37,400	20,600	9,000
1926.....	59,000	48,500	3,600	6,900
1927.....	108,000	81,400	15,400	11,200
1928.....	124,000	91,700	28,700	3,600
1929.....	92,000	73,800	11,000	7,200
1930*.....	92,000*	67,000*	18,500*	6,500*

* An actual inventory of 117,000 tons of raisins on May 31, 1930 was reported, of which about 85,300 tons (73 per cent) were Thompson Seedless, 23,000 tons (20 per cent) Muscats and 8,700 tons (7 per cent) other varieties, largely Sultanas. The inventory total as given for September 1, 1930, was calculated as explained below, and the variety totals by applying the May 31 variety percentage distribution to this total.

The carryover from the 1928 crop on September 1, 1929 was 92,000 tons. Mimeographed release No. 1245, June 7, 1930 of the Dried Fruit Association of California, shows actual receipts of 1929 crop raisins from growers by Sun-Maid and the independent packers up to about the last of April, of 215,000 tons. Completed and shipped sales from September 1, 1929 to August 31, 1930, were 215,000 tons, the same as receipts. Hence unshipped stocks in the hands of the packing industry on September 1, 1930, appear to have been at least 92,000 tons. They may have been slightly larger, since packers estimate that growers held between 5,000 and 10,000 tons of unsold raisins at the time the packing industry reported receipts of 215,000 tons this spring.

Sources of data:

Compiled from records of the Sun-Maid Raisin Growers Association and summarized data of other raisin packers furnished by the Dried Fruit Association through the cooperation of its members. Ninety-five per cent or more of the stocks of California raisins are accounted for by this table.

Thompson and Muscat Supply and Price Changes.—In the absence of adequate data on annual sales by variety, the percentage of receipts by varieties, as shown in table 2, gives the best available clue to changes in their relative importance. However, in order to visualize changes in the quantity sold by varieties, the carryover data by varieties, shown in table 3, must also be considered, as well as the fact that a majority of the by-products made from the 1923 crop surplus utilized Thompson Seedless. The rapid increase in the proportion of Thompson Seedless raisins from 49 per cent in 1921 to 74 per cent in 1929 and the corresponding decline in Muscat production from 39 to 20 per cent of total dried output of the state, helps to explain the fact that since 1925 the f.o.b. price of Muscats, as shown in table 4, has been higher than for Thompson Seedless. For at least fifteen years previous to 1925 prices of Thompson Seedless raisins and returns per acre were usually substantially higher than for Muscats. The greater returns from Thompson Seedless raisins during that period largely account for the tremendous increase in the production of this variety in California during the last twenty years, finally resulting in recent years in a somewhat adverse price differential as compared with Muscat prices.

PRICE CHANGES

Figure 1 shows not only the big increase in California raisin sales since the War but also the great decline in f.o.b. prices. The extreme decline from 14.0 cents in 1921 to 7.3 cents in 1923 reflects the artificially high raisin prices of 1921, the moderately adverse business conditions of 1923, the tremendous state crop of that year, and low prices in foreign countries.

Expansion of the total tonnage sold between 1923 and 1926, while average prices remained practically on the level, reflects increased export sales which were stimulated by the increasing differential by which California raisins undercut raisins from other countries in the chief export markets. (See fig. 4 and p. 88). Increased foreign demand, resulting largely from Sun-Maid Raisin Growers Association's foreign sales campaign, has also helped to expand export tonnage since 1923. To maintain the average level of prices from 1923 to 1926, however, required considerable by-product utilization, largely from the bumper crop of 1923, and resulted in undesirably large carryovers (see table 3).

In spite of the bumper crop of 1926, California prices were maintained and sales, as a result, expanded but slightly. With a very large carryover at the end of the season and another bumper crop in 1927, prices were reduced to a 5.9 cent average for the season. The price cut, however, was not drastic enough to sell the available raisin tonnage, and, when the large 1928 crop was dried, a huge tonnage of the 1927 harvest was still on hand. When these facts and their possible effect on the Sun-Maid Raisin Growers Association became generally known, California raisin prices declined to a very low level, averaging about 4.7 cents for the season of 1928 as a whole. The low prices stimulated the sale of the largest tonnage of California raisins ever sold in a single year.

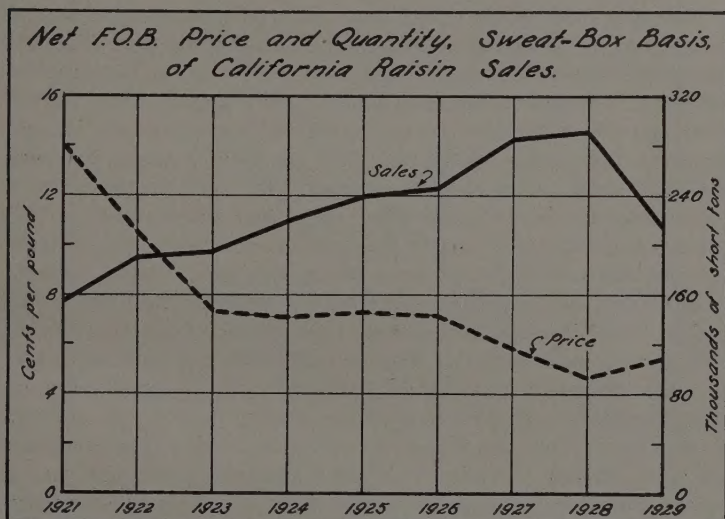


Fig. 1. Data for years beginning September 1, from tables 1 and 4.

In spite of low prices during the 1928 marketing season, the unsold tonnage was so large when the small 1929 crop was harvested that available supplies were even greater than the large tonnage sold in the 1928 marketing year. However, in the face of these supplies, the generally depressed business conditions both at home and abroad, and the large foreign crop which brought about drastic reductions in competitor's prices in the United Kingdom, particularly in Australian raisin prices, the price of California raisins unfortunately was raised in the summer of 1929. Apparently the California industry

underestimated foreign competition, the size of the carryover from the 1928 crop, and the unfavorable demand situation and possibly overestimated the probable influence of stabilization activities⁴ for, although the average price of 5.4 cents for the 1929 season was relatively low, the tonnage sold was unusually small. Only about 215,000 tons were disposed of, or practically the equivalent of the 1929 crop, still leaving an inventory of about 92,000 tons of old raisins on hand in the state on September 1, 1930, to handicap the 1930 marketing season.⁵

RELATION OF DOMESTIC SALES TO PRICES

Normally price is one of the most important factors determining the quantity of raisins consumed in the domestic market⁶. Figure 1 has already shown that prices have been low when the tonnage sold was large. The scatter diagram, figure 2, gives a more direct picture of the fact that high prices are associated with small consumption and low prices with large consumption. The quantity of raisins imported into the United States since September, 1922, and the quantity of raisins imported into Canada other than those originating in California, has been so small that it has been disregarded in this analysis. The free-hand curve *dd'* indicates the approximate relation between the quantities sold in the domestic market in the years 1922, 1924, 1925, 1926, and 1927, in which demand conditions affecting California's raisin markets were more favorable than in 1923, 1928, and 1929 and probably more favorable than they can be expected to average for several years, considering the prospects of low general price levels and also of large raisin crops and hence low prices for raisins from Australia and other foreign countries. This curve indicates that the domestic demand for raisins is inelastic, the elasticity at different points varying from approximately 0.3 to 0.4. It takes a relatively drastic cut in price, therefore, to induce any substantial increase in the amount consumed and large supplies return a smaller income to the industry than small supplies. Large crops of raisins are, therefore, extremely

⁴ See accompanying paper regarding certain of the activities of the Federal Farm Board and the California Grape Stabilization Board in 1929: Mallory, L.D., S. R. Smith and S. W. Shear. Factors affecting annual prices of California fresh grapes, 1921-1929. Hilgardia, 6:127. 1931.

⁵ See table 3 and footnote for details regarding the carryover situation on September 1, 1930.

⁶ Throughout this paper the United States and Canada together are considered as the domestic market in keeping with the usual practice of the California dried-fruit trade.

serious, since prices must be set very low in order to move them into consumption and growers receive very much less for large crops than for small ones.

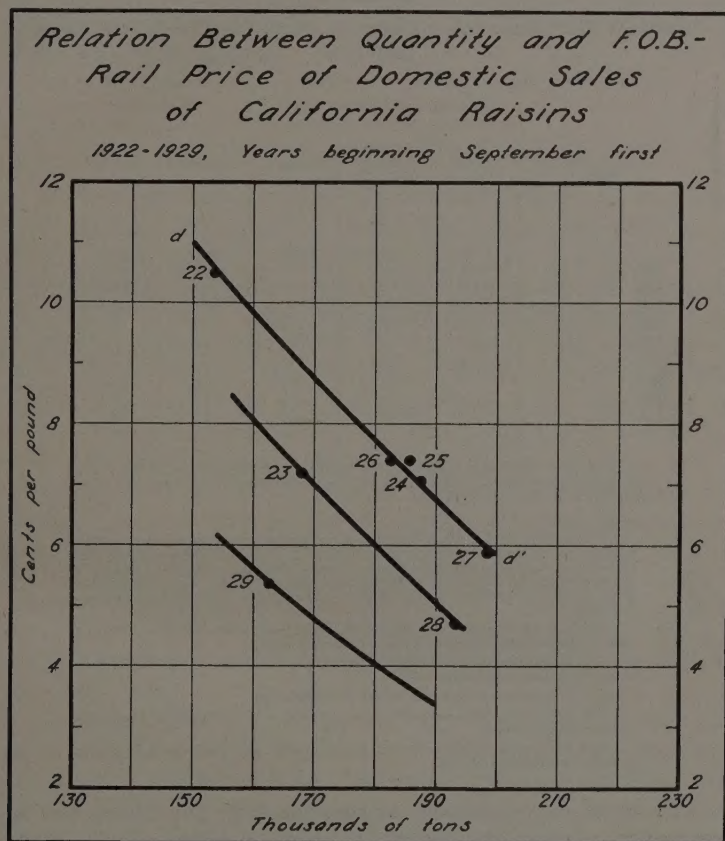


Fig. 2. Domestic sales include California exports to Canada.
Data from tables 1 and 4.

The free-hand curve just below dd' passing through the 1923 and 1928 points approximates a demand schedule under demand conditions less favorable for raisin prices than the average for the years which dd' reflects. Generally adverse business conditions prevailing during the 1923 marketing season apparently account to a considerable

extent for the lower level of raisin prices in that year. In 1928, however, trade uncertainty was perhaps the most important depressive factor.

TABLE 4

CALIFORNIA F.O.B.-RAIL RAISIN PRICES, IN CENTS PER NET PACKED POUND, 1921-1929

Year beginning Sept. 1	Domestic and foreign sales			All varieties	
	Grand total	Thompson Seedless (natural)	Muscats	Domestic	Foreign
	1	2	3	4	5
	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>
1921.....	14.0	*	*	14.0	13.5
1922.....	10.5	*	*	10.5	10.0
1923.....	7.3	*	*	7.2	8.0
1924.....	7.1	7.4	6.8	7.1	7.1
1925.....	7.3	7.3	7.7	7.4	7.2
1926.....	7.2	6.8	7.5	7.4	6.9
1927.....	5.9	5.6	6.7	5.9	6.0
1928.....	4.7	4.4	5.0	4.7	4.6
1929.....	5.4	4.9	6.3	5.4	5.4

* Data prior to 1924 were too incomplete to compute average prices for individual varieties but are sufficient to indicate that Thompson Seedless prices were higher than Muscat prices in the years 1921-1923.

Sources of data:

Compiled from the data reported on completed sales to the trade of Sun-Maid Raisin Growers Association and other packers by dividing money received (net, excluding cash discounts and brokerage) f.o.b. California rail shipping points by the corresponding tonnage of completed sales as reported on a net-weight basis. Sales through by-products' channels and to other packers are excluded from these averages.

Col. 1: Average of all varieties, types, grades and packs, including bleached, soda, and oil-dipped Thompson Seedless and Sultana.

Col. 2: Average of all grades and packs of natural Thompson Seedless, excludes bleached, soda, and oil-dipped.

Col. 3: Average of all grades and packs of Muscats.

Col. 4: Average of all varieties, types, grades, and packs sold in the United States and Canada.

Col. 5: Average of all varieties, types, grades, and packs sold in foreign markets, excluding Canada.

The lowest curve, passing through the 1929 point, indicates approximately the tonnage one might expect to sell in years in which general business conditions were as adverse as in 1929. Tonnage sales indicated by this curve, and the middle curve at half-cent price intervals, are shown in table 10. A similar schedule of the relation of domestic sales to f.o.b. prices can easily be constructed from the upper curves.

Obviously the determination of the shape of the free-hand curves in figure 2 involves a very large measure of individual judgment, since the points upon which they are based are very limited in num-

ber. This is particularly true of the two lower curves, which were included because of the probability that the level of demand may be expected to be more nearly at these lower levels during the next few years than near the higher level of dd' . The great decline in the general level of all commodity prices, beginning in 1929, is obviously in line with this reasoning.

EXPORTS TO FOREIGN MARKETS

Much of the increase in California raisin production and shipments since the War has been absorbed by overseas exports, that is, United States exports to all countries other than Canada⁷. Table 1 shows that the proportion exported to overseas markets rose from about 10 per cent in 1921 to over 33 per cent in 1928, the peak year of post-war exports. Only about 15,000 tons (sweat-box basis) moved to foreign countries in 1921, compared with over 96,000 tons in 1928.

United Kingdom, the Chief Foreign Market for California.—In recent years the United Kingdom has been the largest market for California export raisins, absorbing over 40 per cent of the total California overseas exports. During the last three years this one market has imported an average of nearly 31,000 short tons (equivalent sweat-box basis) of California raisins, or nearly one-eighth of the state's total sales tonnage and over one-third of the total raisin imports of the United Kingdom (see table 6). Because of its importance and representativeness, special study of this foreign market has been made in an endeavor to explain what determines the price of California raisins in European markets.

Until about 1924 Turkey⁸ was the chief source of United Kingdom raisin imports. Australian production previous to that time was small and largely consumed at home. Therefore, it affected the world market but slightly. Since then, however, California and Australia have become the two most important sources, Turkey declining to about half its former importance. The large and increasing proportion of United Kingdom raisin imports supplied by Australia is shown in table 7. During each of the last two years they have amounted to nearly 47 per cent of the total.

⁷ As indicated in footnote 6, page 78, exports to Canada are included in domestic sales.

⁸ A large part of Turkish raisins are exported from Smyrna and hence the trade frequently uses the term "Smyrna" raisins as synonymous with "Turkish" raisins.

TABLE 5
WORLD PRODUCTION OF RAISINS BY COUNTRIES, 1921-1930

Year harvested	Production in short tons, dry weight						
	Total	California	Total, foreign countries	Turkey (Smyrna)	Australia	Spain	Greece and Crete
	1	2	3	4	5	6	7
1921.....	219,900	145,000	74,900	37,400	9,400	12,100	16,000*
1922.....	324,600	237,000	87,600	41,200	15,100	15,300	16,000*
1923.....	383,500	290,000	93,500	44,300	20,900	17,300	11,000
1924.....	306,400	170,000	136,400	57,100	33,100	28,200	18,000*
1925.....	313,200	200,000	113,200	32,500	28,600	33,600	18,500
1926.....	391,700	285,000	106,700	39,200	25,100	25,900	16,500
1927.....	455,400	300,000	155,400	56,000†	49,000	25,800	24,600
1928.....	395,700	268,000	127,700	49,300	27,600	25,200	25,600
1929.....	372,700	215,000	157,700	56,000†	59,000	20,700	22,000
1930†.....	332,200	192,000	140,200	41,500†	59,000	17,700	22,000*

Per cent of total production							
1921.....	100.0	65.9	34.1	17.0	4.3	5.5	7.3
1922.....	100.0	73.0	27.0	12.7	4.7	4.7	4.9
1923.....	100.0	75.6	24.4	11.6	5.4	4.5	2.9
1924.....	100.0	55.5	44.5	18.6	10.8	9.2	5.9
1925.....	100.0	63.9	36.1	10.4	9.1	10.7	5.9
1926.....	100.0	72.8	27.2	10.0	6.4	6.6	4.2
1927.....	100.0	65.9	34.1	12.3	10.7	5.7	5.4
1928.....	100.0	67.7	32.3	12.4	7.0	6.4	6.5
1929.....	100.0	57.7	42.3	15.0	15.8	5.6	5.9
1930†.....	100.0	57.8	42.2	12.5	17.8	5.3	6.6

* Rough estimates based on crop-year exports of raisins from Greece and Crete and production condition of Greek currants for 1921, 1922, and 1924.

† It is estimated that 700 tons will be used by the Alcohol Monopoly from the 1930 crop of Turkish raisins compared with 13,900 tons of the 1929 crop. A portion of some previous crops have also been utilized for alcohol.

‡ All 1930 data are preliminary and subject to revision.

Sources of data:

Col. 1: Sum of California and total of foreign countries.

Col. 2: Compiled from California Crop Reports. These data are not exactly comparable to those shown in tables 1 and 3.

Col. 3: Sum of production for countries for which data are given in cols. 4, 5, 6, and 7. Persian production, although large, is not included in this table because of lack of reliable data and because its influence on California raisin prices has apparently been negligible. From 15,000 to 30,000 tons of Persian raisins have been exported annually in recent years, almost all being consumed in Russia.

Cols. 4, 6, and 7: Compiled from unofficial estimates largely from reports of the U. S. Dept. Commerce Bur. of Foreign and Domestic Commerce and of the U. S. Dept. Agr. Bur. of Agr. Econ., except the estimates of the authors for Greece and Crete for 1921, 1922 and 1924.

Col. 5: Data for 1921-1928 from Squire, E. C. Australian raisin and currant industry, U. S. Dept. Com. Trade Inform. Bul. 699:6. 1930.

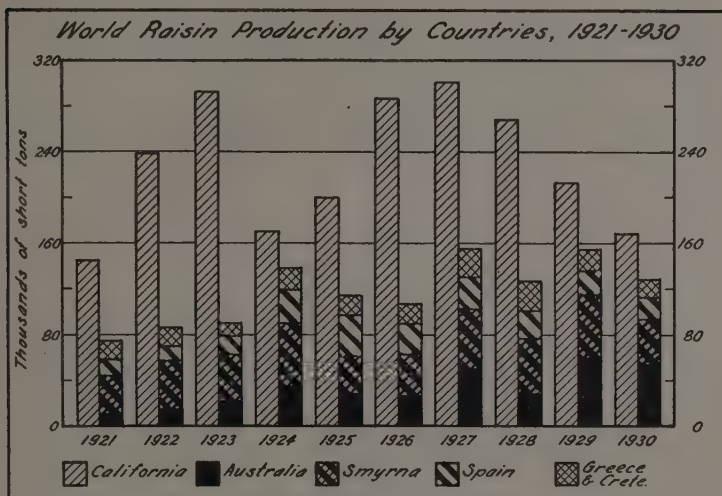


Fig. 3. Data from table 5.

For the purpose of analyzing the factors affecting exports from this state, California f.o.b.-rail export prices have been compared with *United Kingdom* prices, since they are fairly representative of prices prevailing in overseas markets for foreign raisins. Moreover, it is the only country importing raisins from Australia in large quantities and, as figure 3 and tables 5 and 6 show, Australian raisins now constitute a substantial proportion of the world's commercial supplies. *Declared import values per pound* (calculated by dividing the declared import value by the quantity imported) have been used, primarily because no other more satisfactory current price series for California raisins in the United Kingdom was found readily available. The import values per pound also have the merit of being based upon data compiled and issued regularly and promptly each month by a reliable official agency.

In comparing the United Kingdom import values per pound, duty added, of raisins from different countries as shown in table 8, and figure 4, it must be remembered that each is a weighted average of all varieties, types, grades, and packs of raisins imported from each of the designated countries. The relative importance of the different classes of raisins determining the average for each country may differ appreciably. Trade literature gives the impression that a larger proportion of United Kingdom raisin imports from Australia than from California may be of the bleached and dipped types. If this be true

one would expect the price of imports from Australia to average higher, as a whole, than imports from California, since, because of English preference, bleached raisins normally command a higher price than unbleached in that market. Moreover, because of the greater cost of processing bleached and dipped raisins they should in the long run bring higher prices than the natural product, although

TABLE 6
UNITED KINGDOM RAISIN IMPORTS BY CHIEF COUNTRIES OF ORIGIN, 1921-1929

Years beginning Sept. 1	Net weight, short tons				
	Total	United States	Australia	Turkey (Smyrna)	All but United States
1921.....	49,200	7,200	4,800	17,100	42,000
1922.....	70,600	19,800	19,700	14,000	50,800
1923.....	62,700	9,700	15,400	21,400	53,000
1924.....	71,000	13,800	25,700	19,900	57,200
1925.....	58,500	21,500	12,100	7,500	37,000
1926.....	74,200	25,000	20,300	13,300	49,200
1927.....	86,400	33,000	23,400	11,900	53,400
1928.....	96,800	34,400	35,900	13,000	62,400
1929*	80,100	19,100	35,400	10,200	61,000
	Per cent of total				
1921.....	100.0	14.6	9.8	34.8	85.4
1922.....	100.0	28.0	13.7	19.8	72.0
1923.....	100.0	15.5	24.6	34.1	84.5
1924.....	100.0	19.4	36.2	28.0	80.6
1925.....	100.0	36.8	20.7	12.8	63.2
1926.....	100.0	33.7	27.4	17.9	66.3
1927.....	100.0	38.2	27.1	13.8	61.8
1928.....	100.0	35.5	37.1	13.4	64.5
1929*	100.0	23.8	44.2	12.7	76.2

* Preliminary data subject to slight revision.

Source of data:

Basic data compiled from Accounts Relating to Trade and Navigation of the United Kingdom, issued monthly. English hundredweights of 112 pounds converted to nearest hundred short tons.

not necessarily greater net returns to growers. The possible limitations in the comparability of United Kingdom import values per pound of Australian and California raisins, suggest that the differences between the prices of raisins from these two sources may be relative, rather than absolute. Moreover, their comparability will of necessity vary if noncompensating changes in the proportion of high and low-priced raisin imports occur.

Monthly Australian prices weighted by the quantity of California raisins imported into the United Kingdom have been used in getting

an average Australian price for crop years beginning September 1 because it is the quantity of California raisins exported in any given month that presumably is most directly influenced by the foreign prices prevailing during that particular month. Such an average therefore tends to give more weight to the prices of foreign raisins with which California raisins actively compete at any particular time.

TABLE 7

PRODUCTION AND UNITED KINGDOM IMPORTS AND DECLARED IMPORT VALUES
PER POUND, DUTY ADDED, OF AUSTRALIAN RAISINS, 1921-1929

Year of harvest or import year beginning April 1	Australian production, sweat-box basis, short tons	United Kingdom imports from Australia			Declared import value, duty added, cents per pound	Exchangerate per pound Sterling, in cents
		Net packed weight, short tons	Per cent of Australian production	Per cent of United Kingdom total imports		
	1	2	3	4	5	6
1921.....	9,400	2,282	26	5.6	17.9	397
1922.....	15,100	5,023	36	7.3	20.4	452
1923.....	20,900	10,990	57	18.6	16.5	448
1924.....	33,100	21,934	72	33.7	12.6	454
1925.....	28,600	18,446	70	27.8	13.2	485
1926.....	25,100	12,950	56	20.2	14.8	486
1927.....	49,000	33,541	74	35.5	13.5	487
1928.....	27,600	14,591	57	19.0	12.1	486
1929.....	59,000	42,392	77	46.9	9.2	486
1930.....	59,000*	36,528*	62*	46.9*	8.3*	486

* Preliminary data, subject to slight revision.

Sources of data:

Col. 1: Data given to the nearest hundred tons are for crops harvested in the calendar year indicated, years 1921-1928 from: Squire, E. C., Australian raisin and currant industry, U. S. Dept. Com. Trade Inform. Bul. 699:6, 1930. Data for 1930 are preliminary estimates.

Cols. 2, 4, and 5: Data for years beginning April 1 compiled from Accounts Relating to Trade and Navigation of the United Kingdom, issued monthly. Conversions to cents per pound computed as follows: pounds sterling (£) per English hundredweight divided by 112, times the exchange rates in col. 6. The preferential duties added to the declared import value per pound are for 1921, 1.46 cents; 1922, 1.66 cents; 1923, 1.65 cents; 1924, 1.36 cents; 1925, 0.6 cents. All Australian raisins have entered the United Kingdom duty free since July, 1925, and hence nothing was added to the declared import value per pound for crop years 1926 to date.

Col. 3: Based upon col. 1 and items in col. 2 increased by 7 per cent to convert to an approximate sweat-box equivalent of the net import weight.

Col. 6: Simple average of monthly exchange rates for years beginning April 1, compiled from Federal Reserve Bulletin.

Compared with an Australian price weighted by the quantities of Australian raisins imported into the United Kingdom, it gives heavier weight to Australian prices during the fall and winter months when the majority of California export sales are completed, and much less weight to Australian prices in the following spring and summer when Australian exports are greatest and California's relatively the smallest.

Prices of Australian raisins are shown by figure 4 to be fairly representative of raisins from all foreign countries. The Australian prices, therefore, have been used since they are more readily compiled than the average of all foreign countries and since the price at which each crop of Australian raisins is moving is known for several months in advance of California's harvest. It therefore serves as an important indication of about what prices California may expect to compete with in foreign markets. In using the price of Australia's new crop of raisins in the summer, however, as an indication of the probable level of price competition in the fall, caution must be exercised in years in which the Australian crop is unusually small and the outlook for production in other countries is average or greater. In such years Australian raisins are likely to have a greater price differential over raisins from other foreign countries than usual. For this reason, it is desirable to be particularly well informed regarding the condition of the Turkish crop in judging whether the Australian price during spring and summer months is likely to be representative of the fall harvest of raisins from north of the equator, Turkey being California's next most important competitor, after Australia, in the European raisin market.

Foreign Competition in 1922, 1923, and 1924.—In 1922 the English import price of raisins from Turkey, then the chief foreign competitor of California, was so high as to be detrimental to her volume of sales. With lower prices, therefore, California was able to expand her exports substantially. Although foreign production in 1923 exceeded that of 1922 but slightly (see table 5), prices of foreign raisins were drastically reduced, probably because their sales had dragged so badly the preceding season. The export prices of California raisins were also drastically cut in 1923 and still further reduced in 1924. The import prices of Australian and of other foreign raisins in the United Kingdom, however, were so low in both of these years that they undersold California, reducing exports from this state both in 1923 and 1924 to considerably below the movement in 1922. A decrease in the United Kingdom preferential import duty in August, 1924, was also responsible, to a slight degree, for depressing Australian prices in that market.

*Relief Measures for Australian Industry.*⁹—Inasmuch as the Australian government had actively encouraged returned soldiers to plant vineyards after the War, it took definite steps to help its raisin industry when the serious prospects of continued low prices

⁹ This sketch is based in part on: Bauer, Walter. Australian raisin and currant legislation. An unpublished manuscript in the Giannini Foundation Library.

became evident about 1924. Its first measure was the Act of October 20, 1924, which established a Dried Fruits Export Control Board, the aim of which was to secure optimum returns for the Australian industry, largely by restricting the quantity exported, by establishing a domestic price higher than the possible export level, and by consigning a portion of the domestic retention to industrial (distillery) use. By means of funds from the export levy and from contributions of the Commonwealth Government itself the Board has also carried on a successful publicity campaign for about five years, stimulating the demand for Australian raisins, particularly in the United Kingdom. Similar efforts by the Empire Marketing Board to create 'Empire consciousness' have also helped to increase the demand for Australian raisins in English markets.

Preference for Australian raisins in the Canadian and the United Kingdom markets has also been gained by tariff provisions admitting their raisins free or at greatly reduced rates of duty, whereas other countries (with the partial exception of Greece) pay substantial import duties. Previous to July, 1925, the Australian preference in the United Kingdom was less than half a cent a pound. At that time, however, the preference was increased to 1.5 cents, Australian raisins being admitted duty free (see table 8).

Foreign Competition in 1925 and 1926.—The raisin crops and exports of Australia and Turkey in 1925 and 1926 were considerably smaller than in 1924, and hence they were able to raise their prices in 1925 and 1926. Probably because of the preferential duty and the activities of the Dried Fruit Control Board and the Empire Marketing Board, Australia raised her 1926 prices even higher than Turkey's. California raisin prices in the United Kingdom, however, were lowered both years, so that the import value of her raisins, duty added, averaged nearly 2 cents a pound below that of Australia in 1925 and over 4 cents lower in 1926. This large price differential, together with the relatively small competitive tonnage from Australia and Turkey, enabled California to substantially increase her foreign exports in 1925 and 1926.

Competition from Australia in 1927 and 1928.—Raisin production both in California and in foreign countries was large in 1927, which caused United Kingdom import prices to decline. In spite of the largest raisin crop in her history, however, Australia tried to dispose of the bulk of it in the United Kingdom at a differential over California prices nearly as wide as in 1926. This helped to increase California exports.

In the face of this competition the Australian Export Control Board would probably have been forced to lower their prices in the United Kingdom in the fall of 1927 had not a severe frost on September 24 cut their 1928 crop prospects by one-half. The outlook for a short 1928 Australian crop strengthened the market for all raisins. Although Australia exported unusually large quantities of her 1927 bumper crop at high prices, at the end of the season, April 30, 1928, her London stocks were greater than end-of-season stocks had ever

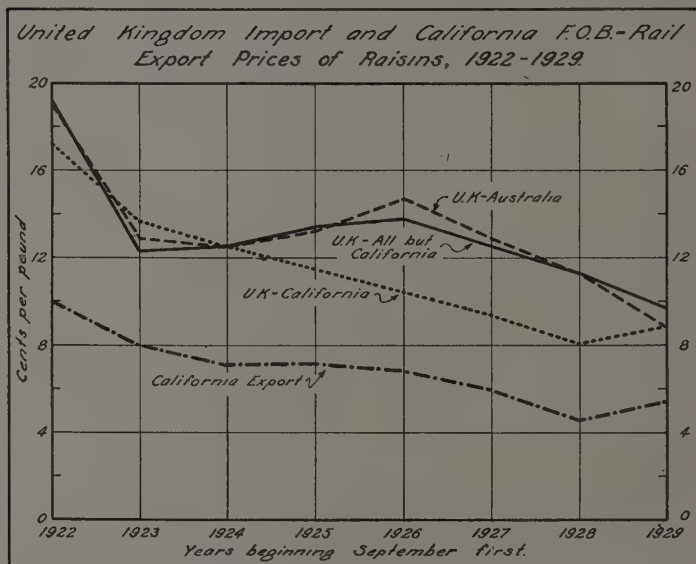


Fig. 4. Data from tables 4 and 8.

been before. Within the year they had risen from about 3,000 to 8,000 short tons. In addition Australian stocks at home were large. Chiefly because of this situation all foreign competitors lowered their prices decidedly.¹⁰ California, however, lowered her export prices nearly as much as her competitors, underselling them by an average of 3 cents during the 1928 crop year. As a result, Australian exports were small and those of California unusually large. The total sales of Australia were only equivalent to her small 1928 crop. This left

¹⁰ Part of the lower average for Australian prices was due to an unusually large proportion of low-grade raisins.

the London stocks on April 30, 1929 still as large as the year before and her inventory at home about 5,000 tons.¹¹

The 1929 Decline of Australian Prices.—In addition to large unsold stocks in the United Kingdom, the 1929 Australian crop was a record one. To favor the export of such a crop, the price was dropped about 3 cents in March of that year and had remained between 8 and 9 cents up to February, 1931 (see fig. 5). In spite of the fact that during the year 1929 the Australian price actually averaged lower than that of California, the London stock of Australian raisins in April, 1930, was about 15,000 tons, nearly twice the amount ever before experienced. Moreover, the stocks in Australia amounted to about 10,000 tons.¹² Such a large carryover has helped to keep the 1930 price of Australian raisins at a low level, thereby increasing competition with California raisins.

TABLE 8

UNITED KINGDOM DECLARED IMPORT VALUE PER POUND, DUTY ADDED, OF RAISINS
BY CHIEF COUNTRIES OF ORIGIN, 1922-1929

Year beginning Sept. 1	Duty per pound		Exchange rate per £	Import value per pound				
	General	Prefer- ential		United States	Austra- lia	Turkey (Smyrna)	All but U.S.	All countries
	1	2	3	4	5	6	7	8
	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>
1922.....	2.2	1.7	458.7	17.2	19.0	20.8	19.1	18.5
1923.....	2.0	1.6	438.1	13.7	12.9	11.6	12.3	12.5
1924.....	1.4	1.2	465.1	12.6	12.5	12.1	12.5	12.5
1925.....	1.5	0	485.6	11.5	13.2	15.1	13.4	12.7
1926.....	1.5	0	485.4	10.5	14.7	13.7	13.8	12.7
1927.....	1.5	0	487.3	9.4	12.9	11.9	12.5	11.4
1928.....	1.5	0	485.1	8.1	11.3	10.6	11.3	10.2
1929.....	1.5	0	486.6	8.8	8.8	9.7	9.7	9.5

Sources of data:

Cols. 1 and 2: Compiled from official sources with conversions to cents per pound as follows: Pounds sterling (£) per English hundredweight divided by 112, times the exchange rates given in col. 3. The general duty in col. 1 is added to the import value of all countries except Greece and British possessions. The preferential duty in col. 2 applies to imports from Australia, South Africa, and other British possessions.

Col. 3: Simple averages of monthly exchange rates for years beginning September 1, compiled from the Federal Reserve Bulletin.

Cols. 4-8: The basic data from which these prices were compiled appear in the Accounts Relating to the Trade and Navigation of the United Kingdom, issued monthly as imports in English hundredweights of 112 pounds and declared import values in English pounds sterling (£). The average prices in col. 5 are computed by weighting the monthly United Kingdom import value per pound of Australian raisins by the quantity of California raisins imported into the United Kingdom during the corresponding months. The prices shown in cols. 7 and 8 include the corresponding prices for Australia shown in col. 5 weighted by the actual quantity of Australian raisins imported into the United Kingdom during the year beginning September 1. The duties added for individual countries and the method of converting to cents per pound are indicated above in the footnote to cols. 1 and 2.

¹¹ The Fruit World of Australasia 31:200. May 1, 1930.

¹² The Fruit World of Australasia 31:200. May 1, 1930.

Relation of California Exports to Prices.—The free hand curve dd' in figure 6 is drawn to indicate the average relation between the tonnage and the prices of California raisins exported for the three crop years 1923, 1924, and 1929 in which the United Kingdom import prices of California¹³ and of Australian raisins were practically the same. It may be thought of as approximating the overseas demand schedule for California raisins at prices practically the same as those of foreign competitors.

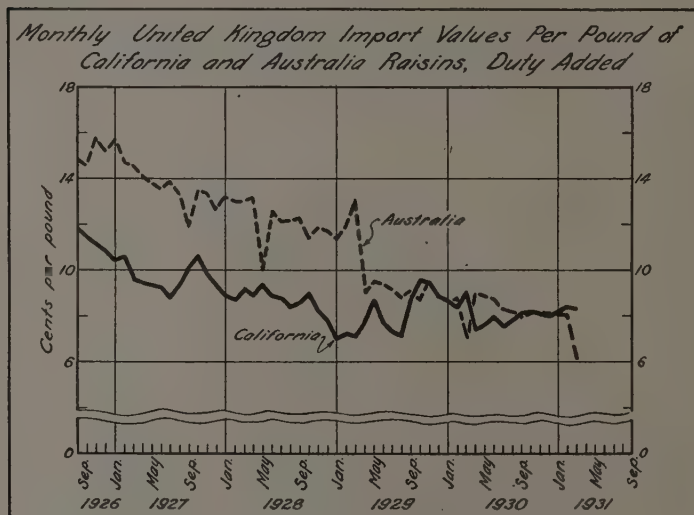


Fig. 5. Data from table 9.

In the other years shown in figure 6, California raisins undercut Australian on the English market by a wide margin, as may be seen in figure 4. This fact appears to account very logically for the increased tonnage of California raisins exported to overseas markets in these other years. Section B of figure 6 shows the close relation between these price differentials and the differences between the tonnage of California raisins actually exported in any given year and the tonnage that line dd' indicates might have been exported if California and Australian prices had averaged approximately the same.

¹³ During the last few years the United Kingdom import price of California raisins, duty added, has been approximately 3.5 cents higher than our f.o.b.-rail export price because of exporting costs and the English import duty.

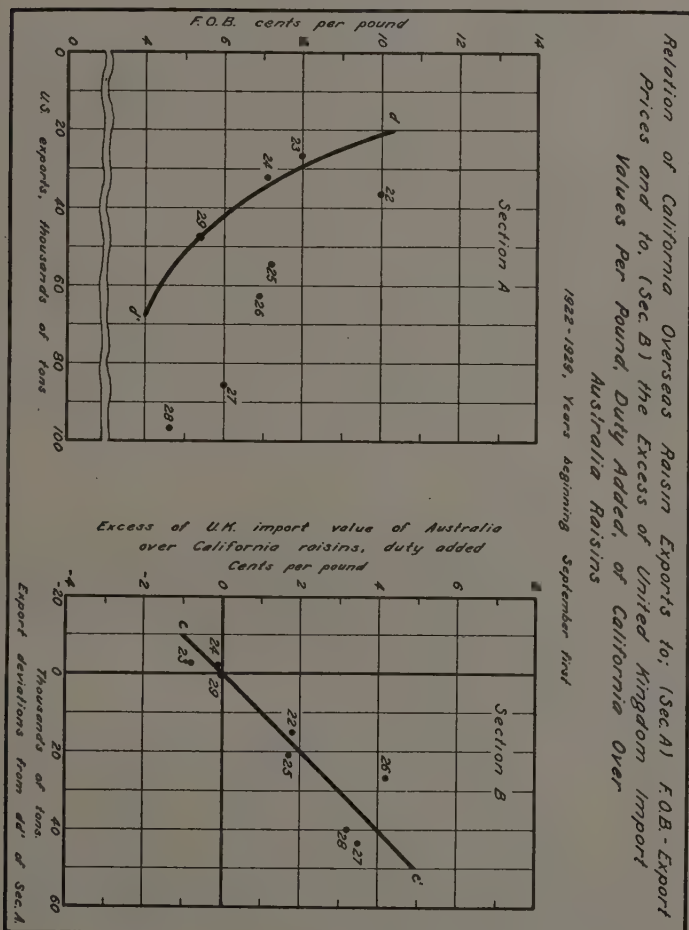


Fig. 6. Data from tables 1, 4, and 8.

These price differentials appear to be a good measure of foreign competition in overseas markets in recent years. The curve *cc'* indicates that annual exports from California have tended to be about 10,000 tons greater for every cent that the Australian price has exceeded California's.

In the years 1923, 1924, and 1929, with little difference between Australian and California prices, competition was keen and California export sales small. The situation, however, was more favorable to California in the years 1925, 1926, 1927, and 1928, in which the Australian price averaged 2 to 4 cents above that of California. As a result, California exported considerably greater quantities than indicated by curve *dd'* in section A.

The apparent discrepancy in 1926 was largely due to the fact that Australian production was unusually small and her price somewhat too high to be exactly representative of the competition that California raisins met in foreign markets. Had the smaller price differential between foreign raisins as a whole and California raisins been used in figure 5, the 1926 deviation would be decreased.

TABLE 9

MONTHLY UNITED KINGDOM IMPORT VALUES OF CALIFORNIA AND OF AUSTRALIA RAISINS SINCE SEPTEMBER, 1926, IN CENTS PER POUND, DUTY ADDED

Month	1926-27		1927-28		1928-29		1929-30		1930-31	
	Calif- ornia	Austra- lia	Calif- ornia	Austra- lia	Calif- ornia	Austra- lia	Calif- ornia	Austra- lia	Calif- ornia	Austra- lia
	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>	<i>cents</i>
September.....	11.8	14.8	10.1	11.9	8.6	12.3	8.8	9.1	8.1	7.9
October.....	11.4	14.5	10.6	13.5	9.0	11.4	9.6	8.7	8.2	8.1
November.....	11.1	15.8	9.8	13.4	8.2	11.8	9.5	9.7	8.3	8.2
December.....	10.8	15.2	9.3	12.6	7.8	11.7	8.8	8.9	8.0	8.1
January.....	10.4	15.7	8.9	13.2	7.0	11.4	8.7	8.6	8.2	8.1
February.....	10.6	14.7	8.7	13.0	7.2	11.9	8.4	8.8	8.4	8.1
March.....	9.6	14.6	9.2	13.0	7.1	13.1	9.2	6.9	8.3	6.1
April.....	9.5	14.1	8.9	13.2	7.7	9.0	7.4	9.0	.....	.....
May.....	9.4	13.8	9.4	10.0	8.7	9.5	7.6	8.9	.....	.....
June.....	9.3	13.6	8.9	12.6	7.7	9.4	7.9	8.7	.....	.....
July.....	8.8	13.9	8.8	12.1	8.3	9.2	7.5	8.3	.....	.....
August.....	9.3	13.3	8.4	12.2	8.1	8.8	7.8	8.1	.....	.....
Weighted Ave.....	10.5	13.8	9.3	12.8	8.2	9.6	8.8	8.7	.....	.....
Exchange rate.....	485.4	485.4	487.3	487.3	485.1	485.1	486.6	486.6	486.6	486.6

Source of data:

The basic data from which these prices were compiled appear in the Monthly Accounts relating to Trade and Navigation of the United Kingdom as imports in English hundredweights of 112 pounds and declared import values in English pounds Sterling (£). The import value in cents per pound is computed as follows: £ per hundredweight divided by 112 times the simple average of monthly exchange rates for years beginning September 1 as shown in the bottom line of the table. The duty of 1.5 cents a pound was added to get the California price as given. Australian raisins have been admitted duty free since 1925. The annual prices are weighted averages.

OTHER CONSIDERATIONS

Although the greater part of the variations that have occurred in the crop-year sales and prices of California raisins during the last nine years have been accounted for in this analysis, there are probably several other factors, mostly minor, that have exerted some influence, such as trend in demand, competition from currants¹⁴ and other fruits, variations in variety, type, quality, and style of packages, advance or decline in prices during the year, the lag of retail prices, changes in the general price level, and the psychological attitude of the trade as affected by facts or lack of dependable facts.

The foregoing analysis explains only what has occurred. It may not explain what will occur, as attendant conditions may be very different in the future than they were during the period upon which this analysis is based.¹⁵ However, it should give the industry a better basis than previously has been available for judging the probable price at which a given supply of California raisins may be sold in the future. In using it as a partial basis for deciding what is probably the best raisin-marketing policy to pursue in any particular year, a trained judgment that can ordinarily be acquired only as the result of close first-hand acquaintance with the business of marketing raisins obviously is essential, coupled with an intimate understanding of just what the current situation is and what business conditions are likely to exist during the marketing season.

APPLICATION

Upon the basis of curves in figures 2 and 6, the schedule of prices and sales of California raisins given in table 10 has been prepared to illustrate the method of using this analysis. It shows the approximate relation between the tonnage of California raisin sales and the f.o.b.-rail prices, with domestic demand conditions adverse as indicated by the lower curve in figure 2 (at the level of demand in 1929)

¹⁴ The relation between raisin prices and currant supplies and prices that one might reasonably expect seems to be obscured by the fact that in many years California and world raisin production have both been large when currant production was small, and vice versa.

¹⁵ For example, if large quantities of low-priced raisins from Russia were to be dumped on European markets, as rumored in the dried-fruit trade. See, for example, Taylor, Alonzo E. Cooperate or bust. *Country Gentleman* 50 (6):4. June, 1931.

and also moderately favorable as indicated by the middle curve in the same figure. The foreign sales are based on f.o.b.-rail prices with an allowance of a 3.5-cent margin to approximate the equivalent United Kingdom import value per pound, duty added, as given in column 6. Moreover, the relation shown between the price and the tonnage exported assumes the same level of United Kingdom average import values per pound, duty added, for California, Australia, and other raisins. As shown by section *B* of figure 6, in years in which the United Kingdom import value, duty added, of California raisins has differed from that of raisins from other countries, an allowance of about 10,000 tons for each cent in the price differential has been necessary.

TABLE 10

APPROXIMATE DOMESTIC AND FOREIGN SALES OF CALIFORNIA RAISINS UNDER ADVERSE AND MODERATELY FAVORABLE DEMAND CONDITIONS IN THE DOMESTIC MARKET AND UNDER FOREIGN COMPETITIVE CONDITIONS IN WHICH THE UNITED KINGDOM IMPORT PRICE, DUTY ADDED, IS THE SAME FOR BOTH AUSTRALIA AND CALIFORNIA

Domestic sales			Foreign sales		
Quantity	F.o.b.-rail price per pound with demand conditions		Quantity	California price per pound with United Kingdom import price of Australian and California raisins	
	Adverse	Moderately favorable		F.o.b.-rail price	Equivalent United Kingdom import price, duty added
1	2	3	4	5	6
<i>tons</i>	<i>cents</i>	<i>cents</i>	<i>tons</i>	<i>cents</i>	<i>cents</i>
187,000	3.5	5.4	66,000	4.0	7.5
180,000	4.0	6.0	58,000	4.5	8.0
173,000	4.5	6.7	52,000	5.0	8.5
167,000	5.0	7.3	47,000	5.5	9.0
161,000	5.5	8.0	42,000	6.0	9.5
156,000	6.0	8.5	38,000	6.5	10.0

Source of data:

Col. 2: Based upon the lowest curve (for 1929) in figure 2.

Col. 3: Based upon the middle curve in figure 2.

Cols. 4 and 5: Based upon section *A* of figure 6.

Col. 6: Items in col. 5 plus 3.5 cents per pound.

The table indicates for example, that 167,000 tons of California raisins might be sold in the domestic market at an f.o.b. price of 5 cents under economic conditions like those in 1929. On the other hand, under better conditions of demand, such as the data in column 3 are based upon, the same quantity could be sold at a price of about 7.3 cents.

With the United Kingdom import value per pound the same for both California and Australian raisins, California export sales at a 5-cent f.o.b.-rail price, equivalent to about an 8.5-cent United Kingdom import value, duty added, would appear to be about 52,000 tons. When prices of Australian raisins have exceeded California prices in that market, California's exports have tended to increase about 10,000 tons for each cent of differential as indicated in section *B* of figure 6.

NEEDED CURRENT STATISTICAL DATA

To use effectively the methods and results of this analysis as a partial basis for a marketing and sales policy, the industry must have available certain data on supply at the beginning of the season. Furthermore, in order to check upon the results of the policy adopted and to modify it, if needs be, during the season, current and cumulated data on both prices and quantities sold or shipped are needed. The more important of these statistical data are:

1. *Estimates of California Raisin Production.*—Since it is necessary for buyers and sellers to decide on price and marketing policies early in the season, estimates of the probable raisin output are needed by September 1 or earlier. Preliminary official estimates by the California Crop Reporting Service of the tonnage of raisin grapes dried have not been available in the past until sometime in December. However, preliminary estimates of probable production of California raisin grapes are made by September. The probable tonnage that will be dried is the difference between this estimate of raisin-grape production and the quantities shipped fresh and not harvested. The probable total of fresh raisin-grape shipments is ordinarily not known with any considerable degree of precision until well into October. However, some help in forecasting this may be secured from market information and from the better informed of the shippers and the trade. The difference between the prevailing prices offered the grower for his raisins early in the season by packers, and the prices received for fresh raisin-grape shipments exerts an appreciable influence on the tonnage diverted for drying or for shipping fresh. Some basis for determining the probable effect of these price differentials on utilization are indicated in the accompanying paper.¹⁶

2. *Carryover of Raisins in California on September 1.*—Carryover plus estimates of production indicate supplies available for sale dur-

¹⁶ Mallory, L. D., S. R. Smith, and S. W. Shear. Factors affecting annual price of California fresh grapes, 1921-1929. *Hilgardia*, 6:101-130. 1931.

ing the current marketing season. In the past there have been no reliable data available on the stocks of raisins in California in the hands of the packers and Sun-Maid Raisin Growers Association on September 1. However, the Dried Fruit Association has secured this information from its members for the fall of 1930. If similar data are secured in the future and released as soon after September 1 as possible, the determination of sound price and marketing policies for raisins will be greatly facilitated.

3. Tonnage Sold Monthly, Domestic and Overseas Separately.—Quantities sold currently during the marketing season, along with the actual sale prices, and a knowledge of seasonal variations of both in past years are essential to judging the results of the marketing and price policy being pursued and in deciding whether to modify it or not and if so, how. Moreover, with the help of such monthly data, current stocks of raisins in California can be approximated in the absence of better data on carryover.

Total monthly shipments of California raisins can be compiled fairly accurately from the following series of data, each of which, at present, must be secured from different agencies. They could be rendered more readily available if assembled and released to the industry monthly by a single agency.

(a) Monthly shipments of California raisins from the ports of this country to overseas countries and to Canada are available in the Monthly Summary of Foreign Commerce of the United States.

(b) No similar official data on monthly shipments to domestic markets are available. However, monthly shipments by rail from California are available for raisins and for other dried fruits separately. These are released monthly in mimeographed form by the Dried Fruit Association of California, based upon reports received from each railroad. A number of the larger packers also receive these reports direct from the railroads.

(c) In addition, direct exports from San Francisco and Los Angeles by water to foreign countries are available in the monthly blotters of the United States Department of Commerce, Bureau of Foreign and Domestic Commerce, usually published in various trade papers.¹⁷ Intercoastal shipments from California by steamer to domestic ports are not readily available, although the individual steamship companies send monthly reports covering these data to a few of the packers.

¹⁷For example in the California Fruit News and the Western Canner and Packer.

(d) The only quantities not included in the monthly completed sales of California raisins, shown by rail shipments out of the state plus direct exports by water to foreign countries and domestic inter-coastal shipments, are the small quantities sold and consumed in California. These, however, are a relatively small proportion of the total and can be estimated fairly satisfactorily on a per-capita basis comparable to consumption in the rest of the United States.

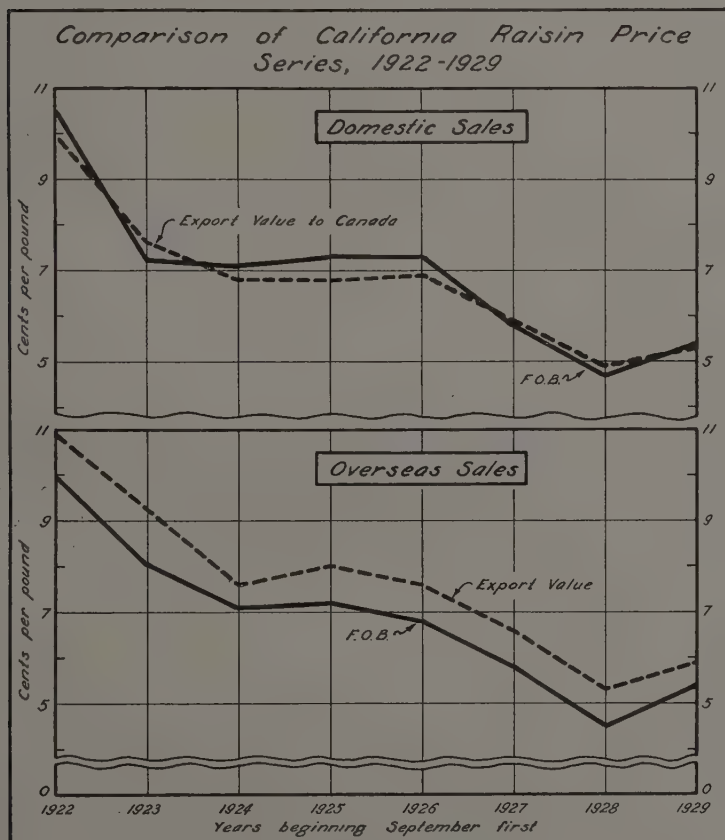


Fig. 7. Data from table 11.

4. *Average Prices of Current Season's Sales to Overseas Markets.*
—Comparison of various raisin-price series that are available indicates that the average declared export values per pound of raisins

exported from the United States to all overseas markets or to the United Kingdom alone are about the best relative indicators of actual prices of California sales to overseas markets. However, study of export values per pound for direct exports from San Francisco may prove them to be even better than those based upon total exports from all United States ports. Declared export prices are easily computed by dividing the quantity exported to overseas markets into the declared values of such exports. Data on the quantity and declared values of exports are available monthly in the Monthly Summary of Foreign Commerce of the United States and can easily be cumulated as the basis of a weighted average for the crop year to date.

Comparison of these declared export values per pound for years beginning September 1, 1922-1929, with the actual f.o.b.-rail prices of overseas sales reported by Sun-Maid Raisin Growers Association and the packers for the corresponding crop years, as shown in table 11, shows that the two have been closely correlated since 1924, the period during which the f.o.b. prices were most completely and accurately reported. The declared export values per pound naturally should be above the f.o.b.-rail prices to cover additional items of expense involved in exporting.

Comparison of United Kingdom import values per pound, duty added, of California raisins (see col. 8, table 11, page 99), with the f.o.b.-rail price of overseas sales shown in figure 7, indicates that in the last four years there has been a rather consistent difference of about 3.5 cents between these two series. The import values into the United Kingdom therefore also appear to have been a fairly good index of California f.o.b.-rail prices of overseas sales in recent years.

5. *Average Prices of Current Season's Sales to Domestic Market.*—Comparison of the domestic f.o.b.-rail price series reported by the packers and the Sun-Maid Raisin Growers Association has been made with a number of other readily available current price series and found to be rather closely correlated with them. Comparison of columns 1 and 2 in table 11 shows that in recent years there has been very little difference between the f.o.b.-rail domestic price of California raisins and the declared export values per pound of California exports to Canada. This relation appears quite logical. Since the monthly and cumulated quantity and declared values of California exports of raisins to Canada are readily available in the Monthly Summary of Foreign Commerce of the United States, the declared import values per pound based upon them are probably the most convenient indicator of current f.o.b.-rail domestic prices of California raisins now available.

Season's averages of monthly quotations from the New York Journal of Commerce for California seeded and seedless raisins have shown a fairly close relation to domestic f.o.b. prices since 1922 (see table 11) and also to declared values per pound of overseas exports.

TABLE 11
COMPARISON OF DIFFERENT SERIES OF CALIFORNIA RAISIN PRICES
IN CENTS PER POUND, 1922-1929

Crop year	Domestic sales				Overseas sales			
	F.o.b.- rail California	Export value to Canada	N. Y. wholesale	U. S. retail	F.o.b.- rail California	Export value	Export value to United Kingdom	United Kingdom import value, duty added
	1	2	3	4	5	6	7	8
1922.....	10.5	10.0	10.5	18.4	10.0	10.9	10.5	17.2
1923.....	7.2	7.6	7.8	15.8	8.0	9.3	8.8	13.7
1924.....	7.1	6.8	7.7	14.6	7.1	7.6	7.5	12.6
1925.....	7.3	6.8	7.5	14.6	7.2	8.0	8.0	11.5
1926.....	7.3	6.9	7.8	14.4	6.8	7.6	7.5	10.5
1927.....	5.8	5.9	7.0	13.7	5.8	6.6	6.6	9.4
1928.....	4.7	4.9	5.0	11.8	4.5	5.3	5.1	8.1
1929.....	5.4	5.3	6.0	12.1	5.4	5.9	5.8	8.8

Sources of data:

Col. 1: from col. 4, table 4, page 80.

Cols. 2, 6, 7: United States exports of California raisins for years beginning September 1, declared export value divided by pounds exported. Basic data compiled from Monthly Summary of Foreign Commerce of the United States. Col. 2 includes exports to Canada only; col. 6 exports to all other countries, except Canada, col. 7 exports to the United Kingdom only.

Col. 3: Based upon monthly quotations nearest the end of each month of California bulk seeded Muscats and bulk Thompson Seedless raisins on the New York wholesale market compiled from the last issue of each month of the New York Journal of Commerce. An average for the 12 months beginning September 1 was computed separately for seeded and seedless by weighting by the monthly shipments of California raisins. The combined average of these two annual prices computed by weighting by the percentage of California production by varieties shown in cols. 2 and 3 of table 2, page 75 are the final averages given above.

Col. 4: Simple average of monthly United States retail price of raisins for years beginning October 1, compiled from the Monthly Retail Prices of the U. S. Bur. of Labor Statistics.

Col. 5: From col. 5, table 4, page 80.

Col. 8: From col. 4, table 8, page 89.

Table 11 shows that there has also been a rather consistent relation between the retail price of raisins in the United States and the domestic f.o.b. price, the former being rather consistently 7 to 8 cents higher than the domestic California f.o.b. price and the New York wholesale price.

6. *United Kingdom Declared Import Values per Pound of Raisins—California, Australia, and Other Countries—Monthly and by Crop Years.*—These prices are based on the data on monthly quantity and declared import values readily available in the Monthly Accounts Relating to the Trade and Navigation of the United Kingdom as indicated in the footnote to table 8, page 89.

ACKNOWLEDGMENTS

This study was made under the guidance of Professor H. R. Tolley, Director of the Giannini Foundation. It has been possible to present many of the most important California data included in the analysis only because of the generous cooperation of the Sun-Maid Raisin Growers Association and of the independent packers acting through the Dried Fruit Association of California. Generous assistance in supplying data and counsel were given by Dr. Holbrook Working and Dr. Alonzo E. Taylor of the Food Research Institute at Stanford University, Dr. E. W. Gaumnitz of the Division of Markets of the California State Department of Agriculture, Professor Donald Sham of Santa Clara University, and Messrs. L. A. Wheeler of the United States Department of Agriculture Bureau of Agricultural Economics, R. S. Hollingshead of the United States Department of Commerce Bureau of Foreign and Domestic Commerce, M. E. Brooding of the California Packing Corporation, K. R. Richardson, formerly with the Sun-Maid Raisin Growers Association, P. Malloch, Manager of Irymple Packing Pty., Australia, Dr. N. J. Silberling of the University of California, and Dr. H. R. Wellman, Mr. E. W. Braun, and Dr. W. Bauer of the College of Agriculture.

FACTORS AFFECTING ANNUAL PRICES OF CALIFORNIA FRESH GRAPES, 1921-1929¹

L. D. MALLORY², S. R. SMITH³, AND S. W. SHEAR⁴

This paper presents the results of an analysis designed to discover and measure the influence of the major factors that have affected the season's price of each class of California fresh grapes—table, black-juice, and white-juice.

The total quantity of California grapes produced in any one year is determined by the bearing acreage, the environmental conditions of growth in that year, and the care expended in their culture. During any one harvesting season, therefore, the total available supply of grapes is not subject to great change. Because the supply of fresh grapes for any given season is relatively fixed it is primarily price-determining rather than price-determined. However, the two-way usage of raisin grapes has some effect upon the quantity of that class of grapes marketed fresh. Raisins take a large portion of the crop, and the relative profitableness of shipping fresh or of drying into raisins influences the amounts utilized in one way or the other. The two uses, however, tend toward equality of returns. With a relatively fixed supply for any given year, changes in price other than those accounted for by year-to-year changes in fresh shipments, therefore, are the result of factors influencing demand. Because of this fact, a large part of this study is devoted to factors which have influenced the demand for fresh grapes.⁵

¹ Paper No. 21, The Giannini Foundation of Agricultural Economics. This study was made with the financial cooperation of the Federal Farm Board.

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⁵ An excellent discussion of the relation of statistical analysis to the laws of price will be found in: Ezekiel, Mordecai. Statistical analysis and the 'laws' of price. *Quar. Jour. of Econ.* 42:199-227. Feb. 1928.

Some discussion of factors affecting California grape prices will be found in the following: Shear, S. W., and H. F. Gould. Economic status of the grape industry. *California Agr. Exp. Sta. Bul.* 429:81-94. 1927. (Continued on page 108)

Were the schedule of demand for California grapes to remain the same over a period of years, it would be possible from data on annual prices and shipments to construct a schedule of prices at which different numbers of carloads could be sold. Explanation of prices and forecasting of season's average prices from shipments would thus be made easy. However, the problem is far from being simple because the demand for the various classes of grapes changes from year to year.

DATA USED

It was necessary to base this analysis on data covering a period of only nine years. Data for years previous to 1921 are limited both as to scope and accuracy. Moreover, the effects of the very abnormal influences of the World War upon prices and other economic conditions for the years just previous to 1921 made the inclusion of data for earlier years inadvisable.

Even as it is, the rapid changes that have occurred in the California grape industry since 1920 have introduced decisive trends and other changes into the data, the effects of which have seriously complicated the analysis. Grape prices, along with other fruit prices, remained high for a year or two longer than the price of staple farm products immediately after the War. Eastern demand for juice grapes was also stimulated by prohibition. Largely as a result of these two facts, grape plantings increased rapidly in California for several years after 1921, with the consequence that production and shipments have followed a rapid upward trend accompanied by drastic declines in the price of all classes of grapes.

Because the greater part of California's fresh grapes has been consumed in eastern cities, prices accurately representing actual sales in these markets were desired. For this reason, farm prices were not used nor, chiefly for the same reason, were f.o.b. prices. Moreover, for the years included in the analysis, f.o.b. prices were not quoted

Stover, H. J. Relation of the production of grapes in western New York and in California to prices. N. Y. S. College Agr., Cornell Univ., Farm Economics No. 59, p. 1111-1113. June, 1929.

Stover concludes that "The multiple correlation between (annual data 1910-1926 on) the purchasing power of the price (i.e. adjusted price) of table grapes in California (X_1), the production of grapes in western New York (X_2), and the production of table grapes in California (X_3): $R_{1,23} = 0.768 \pm 0.067$, indicates that the production of grapes in the two areas accounts for 59 per cent of the factors determining the price received in California. Of this amount, 10 per cent is due to western New York production and 49 per cent to California production. (Note that relatively few California table grapes were unharvested before 1927.)

with sufficient regularity to constitute complete series, their manner of collection was not sufficiently accurate, and the quantities sold at the various prices were not available.

An accurate measure of price could have been obtained from the sales on the eleven auction markets.⁶ Comparison showed, however, that New York delivered-auction prices and the average for the eleven delivered-auction markets differed relatively little. The New York market area receives approximately 20 per cent of the interstate movement of California grapes. Moreover, it is in the same diversion zone as Boston, Baltimore, Pittsburgh, and Philadelphia. Hence, New York auction prices were chosen as representative of eastern sales. Using prices for this one market also obviated the necessity of taking into account varying lengths of time required for transportation from California to different markets when studying the movement of prices during a season, making possible the use of uniform lags between time of shipment and prices upon arrival.

As a measure of the annual quantities of each class of California fresh grapes bought at prices equivalent to the annual New York delivered-auction prices, annual rail shipments (inter and intrastate) of each class of grapes were used. Local truck movement and some small additional tonnage consumed in California is, of course, excluded from rail movement, but the total is relatively small, is difficult to estimate accurately, and probably has influenced eastern prices but little, if at all.

About the only other part of California grape production excluded from rail shipments that may have influenced eastern prices of fresh grapes has been the quantities left unharvested in a number of recent years and the tonnage of raisin grapes that might be diverted from drying to swell the fresh movement. Although the unharvested tonnage may have had some influence psychologically in depressing eastern prices, largely because of the uncertainty of whether some of it might be shipped, the effect has apparently been too small to be appreciable or else has been obscured by other factors. The option of raisin-grape growers of drying or of shipping their grapes fresh has had an appreciable bearing upon fresh Muscat shipments, as discussed later, but has been exercised but little in the case of Thompson Seedless and Sultana.

An added advantage of using data on rail shipments is that they provide comparable supply data as a basis for studying seasonal

⁶ Baltimore, Boston, Chicago, Cincinnati, Cleveland, Detroit, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis.

variation in prices. Additional data used on current movement were arrivals, track holdings, and unloads. Data on unloads, however, were unavailable for 1925 and 1926, and hence the volume of delivered-auction sales was substituted as a measure of current rate of movement into consumption.

TABLE GRAPES

As shown by figure 1, variations in the supply of California table grapes account for nearly all the year-to-year changes in adjusted seasonal average⁷ prices for the nine years 1921 through 1929.⁸ As California shipments have increased (fig. 1 and table 1), New York delivered-auction prices have declined, and vice versa. The regression line dd' , fitted free-hand to the points of the scatter diagram, shows the close relation normally existing between prices and shipments and indicates about how much of a change in price might normally be expected from a given change in table-grape shipments. The demand indicated by this curve is somewhat inelastic. Hence the total value of grapes sold in eastern markets tends to be smaller when annual shipments are heavy than when they are light. With shipments of from about 25,000 to 31,000 carloads of table grapes, elasticity of demand varies from somewhat more than 0.8 with the lighter shipments and higher prices to somewhat less than 0.7 with the heavier shipments and lower prices. The demand appears to be most elastic when supplies are small and prices relatively high.⁹

The regression line in figure 1 may be used to estimate the adjusted price at which any given number of carloads of California table grapes may be expected to sell during a marketing season. The

⁷ Variations in the general level of prices were relatively small during the period 1921-1929 and the variations in grape prices associated with them were too small to be important. However, the probability of future substantial changes in the general price level which might appreciably influence grape prices, led to the decision to adjust actual prices during the period studied. The Bureau of Labor Statistics all-commodity wholesale price index was used in making these adjustments.

⁸ This study was completed before adequate data on the marketing of the 1930 crop were available, and hence they have not been included in the present analysis. However, the preliminary data available show that table-grape prices in 1930 were very closely in line with the regression curve in figure 1. About 26,800 carloads were shipped and the average New York delivered-auction price was about \$95 a ton actual or about \$110 adjusted.

⁹ For a comparison with the elasticity of other classes of California grapes see page 111 for black-juice, page 121 for fresh Muscats. The elasticity of domestic demand for raisins is given in the accompanying paper: Shear, S. W. and R. M. Howe, Factors affecting California raisin sales and prices, 1922-1929. *Hilgardia* 6:78. 1931.

estimated adjusted price can then be converted to an estimated unadjusted price by multiplying by an estimate of the all-commodity wholesale price index for the current calendar year and pointing off two decimal places.

Obviously the relation shown in figure 1 is not perfect, for all the points in the scatter do not fall exactly upon the regression line. Other factors than shipments, therefore, have apparently affected eastern prices of California table grapes.

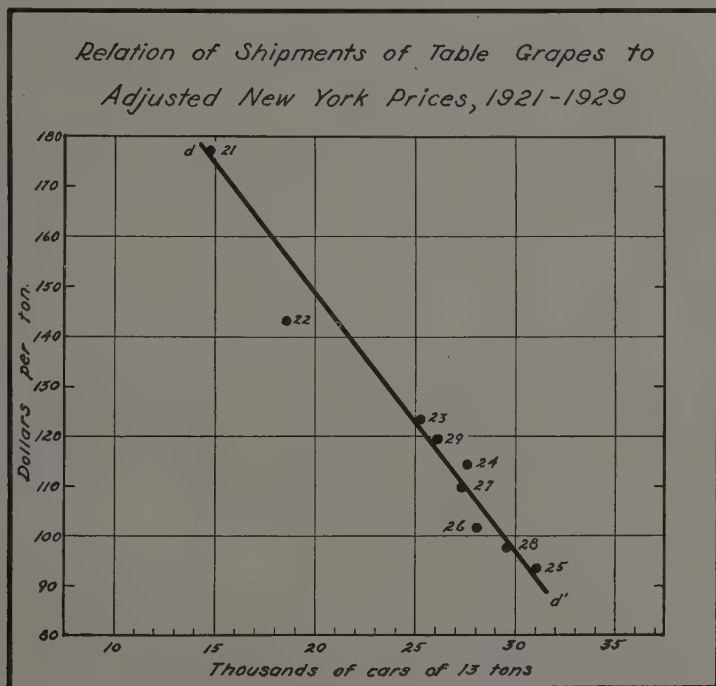


Fig. 1. Data from table I.

Table grapes constitute on the average only some 30 per cent of the annual shipments of all California fresh grapes. The question, therefore, arises as to whether or not the supplies of other classes of grapes (black-juice and white-juice) have had an effect upon the price of table grapes. Superficially it seems that they would have had. However, although some Malaga and a few Tokay and Thompson Seedless have been sold as juice stock, analysis indicates that the small

tonnage of fresh grape shipments having a two-way use has had little, if any, influence on the annual average price of California table grapes. The plotting of the deviations of price from the regression line in figure 1 against shipments of black-juice grapes and Muscats (severally, combined, and in conjunction with other factors) failed to show that these factors had a measurable influence. Apparently the price of table grapes has been little affected by changes in the proportion of total California shipments consisting of black-juice and white-juice grapes. Such a conclusion appears logical when an examination is made of the use of the different variety classes, of the marketing channels, and of the consumers of the different grapes.

TABLE 1

ANNUAL SHIPMENTS AND NEW YORK DELIVERED-AUCTION PRICES OF CALIFORNIA TABLE GRAPES, AND GRAPE SHIPMENTS OF OTHER STATES, 1921-1929

Crop year	Shipments		Price per ton	
	California	Other states	Unadjusted	Adjusted
	1	2	3	4
	<i>carloads</i>	<i>carloads</i>	<i>dollars</i>	<i>dollars</i>
1921.....	14,800	4,473	172.80	177.05
1922.....	18,600	15,967	138.40	143.12
1923.....	25,240	9,988	124.00	123.26
1924.....	27,600	12,238	112.00	114.17
1925.....	31,100	5,812	96.80	93.53
1926.....	28,100	14,732	101.60	101.60
1927.....	27,300	6,752	104.80	109.85
1928.....	29,600	8,611	95.40	97.65
1929.....	26,100	6,897	115.20	119.38

Sources of data:

Col. 1: Total shipments, to the nearest hundred, both inter and intrastate, of all table-grape varieties—Malaga, Tokay, Emperor, Cornichon, and Almeria are the chief ones, and also of Thompson Seedless—in carloads of approximately 13 tons net of grapes. Data for 1928 and 1929 increased 6 per cent to allow for heavier loadings per car. Data for 1921-1926 from reference 1, p. 46. Note—Hereafter references used in sources of data will be numbered according to literature cited on pages 129 and 130). Data for 1927-1929 estimated by applying the variety percentages of interstate shipments to total California shipments including intrastate movement. Basic data for 1927 from reference 2, p. 10-12 and for 1928 and 1929 from references 3 and 4.

Col. 2: Carlot shipments from states other than California. Data for 1921-1923 from reference 5, p. 37-41; for 1924-1926 from reference 6, p. 138 and for 1927-1929 from U. S. Dept. Agr. mimeographed summaries, Monthly Carlot Shipments of Grapes.

Col. 3: Weighted average prices of New York delivered-auction sales of Tokay, Malaga, Cornichon, and Thompson Seedless varieties, in lugs and crates, through the first or second week of November. Converted to price per ton at the rate of 80 packages to the ton. Averages based on daily data as originally reported in the New York Fruit Reporter and summarized for 1924 in reference 12, p. 33-35; for 1925, 1926, and 1927 in reference 2, p. 80-90; for 1928, in reference 9, p. 47-94; and for 1929 in reference 4.

Col. 4: Prices adjusted to 1926 base by use of U. S. Dept. Labor Bureau of Labor Statistics all-commodity index of wholesale prices for calendar years.

Table grapes ordinarily reach the ultimate consumer through retail stores, hotels, restaurants, etc., in very small lots for dessert purposes or for eating out of hand. Juice grapes, on the other hand, are seldom sold in lots of 5 or 10 pounds but reach the purchaser or consumer in lots of several lugs. This is because fairly large quantities are necessary for satisfactory results in the processing of a 'batch' of juice. A considerable portion of the juice grapes are sold in rather large quantities to people of foreign nativity, who, through custom or habit, demand a juice beverage for drinking purposes or as a part of their diet. This discrimination in consumptive uses of table grapes and of juice grapes probably largely accounts for the lack of price relation between the variety classes.

Unlike California juice grapes, the American type of slip-skin grapes of the *labrusca* species grown commercially in large quantities in eastern states is largely used for table consumption. Shipments of these grapes might, therefore, be expected to affect the demand for California table grapes in eastern markets. Plotting of the price residuals of figure 1 against total carlot shipments of grapes other than California (see table 1) indicates that shipments of eastern grapes have had some influence upon the price of California table grapes. In the scatter diagram, figure 1, it will be seen that the points for the years 1922 and 1926 fall below the line, indicating a smaller average price than would have been expected from a normal relation. In each of these years shipments of eastern grapes were particularly large, being 15,967 carloads in 1922 and 14,732 carloads in 1926. However, the volume of eastern grape shipments apparently does not usually have much influence on the price of California table grapes. The two years noted are the only ones out of the nine in which a decided effect can be observed. It was sufficiently important in those years, however, to warrant its being taken into account in any possible predictions.

There are some indications that the earliness or lateness of the bulk of market arrivals of eastern-grown grapes in relation to California arrivals may also affect the influence of season's total supplies of *labrusca* grapes on California table-grape prices.

Because outstanding differences in the seasonal variation in shipments and prices might logically be expected to affect the relation of total season's shipments to season's average prices of California table grapes, such an analysis was made. The results were somewhat disappointing. In the analysis of average annual prices the relation between season's total shipments and average annual prices was marked,

but the relation between weekly shipments and price provided results of only meager value in judging the course of prices from current supplies. It was found, however, that during seasons when shipments from California to eastern markets have assumed a fairly normal, orderly, and uniform movement, excluding periods in which there were abnormal factors such as a truckmen's strike, no major fluctuations have taken place. When shipments have moved East irregularly and large track holdings have accumulated in eastern markets, violent price fluctuations have usually taken place. The attempts of various California shipping organizations in recent years to avoid market gluts appear to have improved the seasonal movement of prices, thereby raising the average price for the season. The study of seasonal variations and fluctuations has emphasized the fact that current weekly prices in eastern markets are affected not only by current shipments but also, during the greater part of the shipping season, by total shipments expected during the whole season. This observation also applies to juice grapes.

The response of weekly prices to shipments during the four years 1926-1929 may be observed in figure 2. The year 1926 is a good example of great fluctuations in weekly prices due to irregular shipments. In contrast, during 1928 and 1929 shipments maintained a uniform flow and weekly prices were fairly uniform, with the exception of the portion of October, 1929, during which the truckmen's strike in New York City occurred.

Unfortunately, lack of appropriate data precluded statistical analysis of the influence of quality upon eastern prices of California table grapes, for there can be no doubt that quality has a substantial effect on prices.¹⁰ No accurate measure of the quality of grapes has been devised and the fragmentary information available is quite inadequate as a basis for statistical analysis. Attractive appearance—well-formed bunches of sound berries free from blemish—together with good flavor and high sugar content, are known to stimulate buying, while poor quality causes consumers to buy only at lower prices or else to turn to substitute fruits if available at attractive prices. Table grapes of poor quality are frequently sold for juice purposes at prices so low that they appreciably reduce the average annual price of table-grape varieties as a group.

¹⁰ According to a letter of June 11, 1930, from Mr. Earl R. French of the New York Food Marketing Research Council to the authors, a number of men in the fruit trade and in marketing research in New York City whom he interviewed expressed the opinion that next to quantity of the market supply, quality is perhaps the most important factor affecting California grape prices in eastern markets.

Weekly New York Prices and Shipments of California Table Grapes 1926-1929
(Includes Thompson Seedless. --- Shipments advanced two weeks)

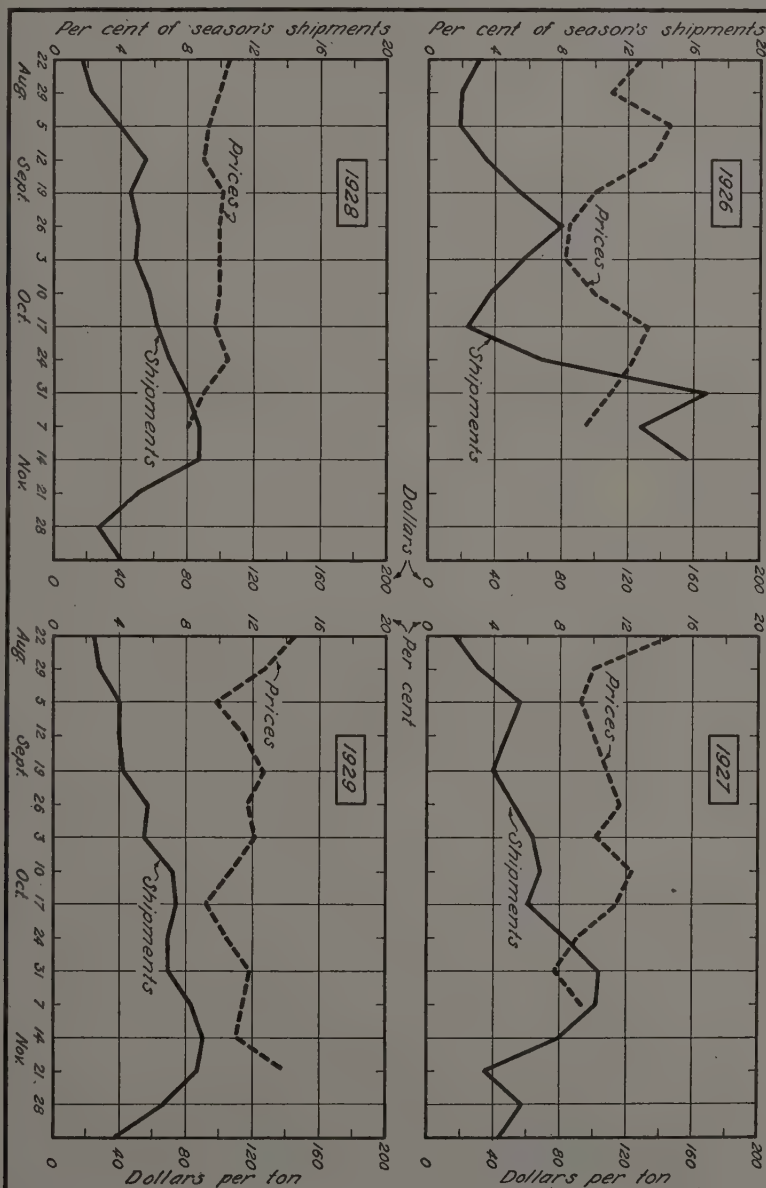


Fig. 2. Data from table 2.

TABLE 2

WEEKLY NEW YORK DELIVERED-AUCTION PRICES AND INTERSTATE SHIPMENTS IN
CARLOADS AND IN PER CENT OF SEASON'S TOTAL, OF
CALIFORNIA TABLE GRAPES, 1926-1929

Week endings (as of 1926)	Price, dollars per ton	Shipments		Price, dollars per ton	Shipments	
		Carloads	Per cent of season's total		Carloads	Per cent of season's total
	1	2	3	4	5	6
	1926			1927		
Season's total.....	*	20,340†	100.00†		26,711†	100.00†
Aug. 7.....	87 20	618	3.04	248 80	476	1.78
Aug. 14.....	119 20	404	1.96	166.40	821	3.07
Aug. 21.....	129 60	390	1.92	147.20	1,486	5.56
Aug. 28.....	109 60	733	3.60	100.80	1,285	4.81
Sept. 4.....	145.60	1,140	5.60	89.60	1,051	3.93
Sept. 11.....	136.80	1,652	8.12	99.30	1,410	5.28
Sept. 18.....	100.00	1,112	5.47	103.80	1,726	6.46
Sept. 25.....	84.00	727	3.57	118.40	1,831	6.85
Oct. 2.....	82.40	475	2.34	912.00	1,624	6.08
Oct. 9.....	119.20	1,399	6.88	124.00	2,208	8.27
Oct. 16.....	132.00	3,430	16.81	115.20	2,780	10.42
Oct. 23.....	124.00	2,655	13.05	92.00	2,738	10.25
Oct. 30.....	111.20	3,195	15.71	75.20	2,107	7.89
Nov. 6.....	93.60	*		93.60	944	3.53
Nov. 13.....	*				1,485	5.56
Nov. 20.....					1,164	4.36
	1928			1929		
Season's total.....	*	28,223†	100.00†		23,110†	100.00†
Aug. 7.....	65.60	515	1.82	216.00	573	2.48
Aug. 14.....	100.80	739	2.62	193.60	638	2.85
Aug. 21.....	114.40	1,151	4.08	146.40	924	4.00
Aug. 28.....	101.60	1,560	5.53	128.00	925	4.00
Sept. 4.....	94.40	1,326	4.70	98.40	957	4.14
Sept. 11.....	90.40	1,449	5.13	115.20	1,334	5.77
Sept. 18.....	102.40	1,444	5.12	127.20	1,313	5.68
Sept. 25.....	100.80	1,619	5.74	116.80	1,689	7.31
Oct. 2.....	100.00	1,763	6.25	121.60	1,718	7.44
Oct. 9.....	100.80	1,972	6.99	107.20	1,624	7.03
Oct. 16.....	97.60	2,250	7.97	91.20	1,618	7.00
Oct. 23.....	105.60	2,459	8.71	104.00	1,435	8.37
Oct. 30.....	90.40	2,479	8.78	119.20	2,122	9.18
Nov. 6.....	23.20	1,453	5.15	114.40	2,020	8.74
Nov. 13.....		749	2.65	110.40	1,572	6.80
Nov. 20.....		1,128	4.00	139.20	874	3.78

* Dashes indicate no data available or insufficient data.

† Includes sales prior to August 1 and after November 20.

Sources of data:

Col. 1: Simple or unweighted weekly average price for lugs and crates of Cornichon, Emperor, Malaga, Thompson Seedless, and Tokay varieties multiplied by 80 to convert to approximate price per ton. Data from reference 8, p. 23-46.

Cols. 4, 7, 10: True or weighted average prices for lugs and crates of varieties listed above and Red Malaga in addition, multiplied by 80 to convert to price per ton. Prices for 1927 from reference 2, p. 58-79; for 1928 from reference 9, p. 47-94; and for 1929 from reference 7.

Col. 2: Estimates for Emperor, Malaga, Thompson Seedless, and Tokay varieties based upon inspections by the Federal-State Inspection Service from reference 8, p. 76, 76.

Cols. 5, 8, 11: Shipments of Emperor, Malaga, Red Malaga, Black Prince, Rose of Peru, Thompson Seedless, and Tokay varieties. Data for 1927 from reference 2, p. 20-25; for 1928 and 1929 from references 3 and 4.

It will have been observed that factors other than that of shipments have not been emphasized. While such other factors as supplies of eastern grapes, and seasonal movement and quality of all table grapes play a part in determining the season's average price of California table grapes, the greatest influence by far is that of total carlot shipments.

A number of factors not discussed in this article that might logically be expected to influence table-grape prices were studied but found to have had an effect too small to be apparent or else an effect obscured by other factors. The more important of these other factors were (1) United States production of certain other fruits, both individually and in combination with one another, (2) various indexes, such as those of factory payrolls, employment, and the price of foods, (3) the proportion of table-grape shipments consisting of different varieties, and (4) track holdings.

BLACK-JUICE GRAPES

As was true of table grapes, California shipments were found to have been the chief determinant of black-juice grape prices¹¹ in eastern markets. Moreover, the demand for black-juice grapes was found to be about as inelastic as that of table grapes (see page 104). Figure 3 shows how close the relation has been, during a period of nine years, between total inter and intrastate shipments of California black-juice grapes and weighted average annual New York delivered-auction prices adjusted for changes in the general level of all-commodity wholesale prices. The regression curve in this figure indicates that the elasticity of demand for black-juice grapes varies from about 0.8 to 0.9 with variations in shipments from about 25,000 to 31,000 carloads.

The greater divergence of the scatter from the regression curve in figure 3 as compared with that in figure 1 indicates that changes in the volume of shipments have accounted for a smaller part of changes in the price of black-juice grapes than in the case of table grapes. The fact that black-juice prices for 1925 and 1926 were so different, although the volume of shipments was practically the same, indicates a definite difference in demand in these two years. This suggests

¹¹ In this analysis the weighted average price of New York delivered-auction sales of the following grapes was used: Alicante Bouschet, Carignane, Petite Sirah, Mission, Mataro and Zinfandel. These six varieties comprise, on an average, about 75 per cent of the annual shipments of black-juice grape shipments from California.

a comparison of the available facts regarding these two marketing seasons as a means of discovering variables other than volume of shipments that may have affected prices. Figure 3 shows a similar, although greater, difference in demand in 1927 compared with 1928.

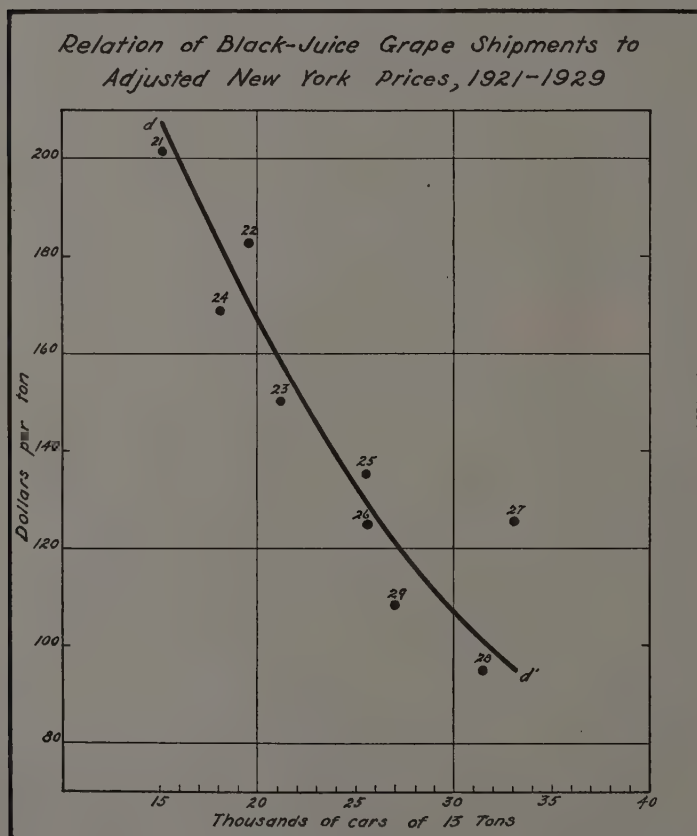


Fig. 3. Data from table 3.

By studying these four marketing seasons carefully with the aid of the general information available in trade literature, as well as the statistical record of California fresh-grape deals, a reasonable partial explanation of the causes of the differences in demand in 1925 compared with 1926 and in 1927 compared with 1928 was worked out.

This, together with other analyses indicated that the more important factors affecting black-juice prices, other than the season's volume of shipments in recent years, have apparently been (1) timing of early black-juice shipments to demand in eastern markets, (2) volume and timing of Muscat shipments, and (3) quality of black-juice stock.

TABLE 3

ANNUAL SHIPMENTS AND ACTUAL AND ADJUSTED NEW YORK DELIVERED-AUCTION PRICES OF CALIFORNIA BLACK-JUICE GRAPES, 1921-1929

Crop year	California shipments	Price per ton	
		Unadjusted	Adjusted
	1	2	3
	<i>carloads</i>	<i>dollars</i>	<i>dollars</i>
1921	15,200	196.80	201.63
1922	19,600	176.80	182.80
1923	21,200	151.20	150.29
1924	18,100	165.60	168.80
1925	25,500	140.00	135.26
1926	25,600	124.80	124.80
1927	33,100	120.00	125.80
1928	31,500	92.80	95.09
1929	27,000	104.80	108.60

Sources of data:

Col. 1: Total shipments to the nearest hundred cars in carloads of approximately 13 tons net, both inter and intrastate, of all black-juice varieties—Alicante Bouschet, Zinfandel, Carignane, Petite Sirah, Mission, and Mataro are the chief ones. Data for 1928 and 1929 increased 6 per cent to allow for heavier loadings per car. Data for 1921-1926 from reference 1, p. 46, 47; for 1927-1929 from same sources and same methods indicated in footnote 1, table 1, page 106.

Col. 2: True or weighted average prices per lug of New York delivered-auction sales through the first or second week in November for the varieties listed above. Converted to price per net ton at the rate of 80 lugs per ton. Data from source indicated in footnote 2, table 1, page 106.

Col. 3: Prices adjusted to 1926 base by use of U. S. Bureau of Labor Statistics all-commodity index of wholesale prices for calendar years.

It is generally conceded by the best-informed marketing agencies that practically all California black-juice grapes shipped to eastern markets are used for wine-making. It is also common knowledge that the making of a good grade of wine requires a temperature conducive to proper fermentation. This study indicates that a weekly average mean temperature of 50° to 60° F is apparently the range within which the most active buying of juice grapes takes place. It will be observed in table 4 that such a temperature usually starts to prevail in New York City anywhere from the first to the third week in October, the month of greatest demand and heaviest sales of juice grapes. Such temperatures generally prevail during a large part of

this month. Judging by sales and unloads data in New York and Jersey City markets, buyers of juice stock usually allow a week to 10 days of such favorable temperature for wine-making to pass before they purchase any considerable quantities of juice grapes. Up to that time buyers appear to have usually been indifferent about purchasing juice stock.

TABLE 4
WEEKLY AVERAGE OF DAILY MEAN TEMPERATURES FOR NEW YORK CITY,
IN DEGREES FAHRENHEIT, 1925-1929

Week ending	1925	1926	1927	1928	1929	Five-year average
Aug. 7.....	71.7	75.5	69.3	79.1	70.5	73.2
Aug. 14.....	74.4	76.7	70.4	75.7	73.0	74.0
Aug. 21.....	74.1	66.1	66.7	74.1	70.8	70.4
Aug. 28.....	67.9	71.3	64.4	70.0	70.3	68.8
Sept. 4.....	71.9	64.7	67.4	74.4	78.3	71.3
Sept. 11.....	71.2	66.2	69.9	65.5	71.5	68.9
Sept. 18.....	70.3	66.9	68.4	70.9	60.7	67.4
Sept. 25.....	62.4	63.9	62.7	66.1	65.7	64.2
Oct. 2.....	59.7	64.6	66.3	54.2	57.7	60.5
Oct. 9.....	55.5	54.4	68.1	60.2	53.4	58.3
Oct. 16.....	49.9	52.4	56.6	62.6	53.3	55.0
Oct. 23.....	47.9	49.4	52.8	63.9	57.0	54.2
Oct. 30.....	44.6	49.0	57.9	51.5	55.0	51.6
Nov. 6.....	44.9	48.4	52.4	47.9	49.3	48.6
Nov. 13.....	47.0	45.1	43.1	48.0	52.5	47.1
Nov. 20.....	46.7	41.3	50.8	50.7	42.4	46.4
Nov. 27.....	39.9	41.3	46.2	46.2	34.5	41.6

Source of data: U. S. Dept. Agr. Climatological Data.

Study of the shaded areas in figures 4¹² and 5 brings out the fact that in 1926 and 1928 sales and unloads of black-juice grapes lagged a week to two weeks behind arrival of shipments. This condition occurred because California black-juice grapes matured early and a considerable volume reached eastern markets before the proper temperature prevailed to create a strong demand for them. Apparently, because of this fact, prices opened at a lower level than they would have if heavy shipments had been delayed until demand had strengthened. The season's average price in both years was lower than the regression curve in figure 3 would lead one to expect from the season's total black-juice shipments. The tendency for prices to strengthen during the period of heavy sales in both 1926 and 1928 also suggests that demand, during the early part of the season, was not strong enough to support the heavy early arrivals.

¹² In figure 4, weekly volume of auction sales of black-juice grapes in New York City were substituted for weekly unloads because there were no available unload statistics for seasons prior to 1927.

Weekly New York Temperatures, Muscat Shipments and Black-Juice Shipments, Auction Sales and Prices, 1925 and 1926 (Shipments advanced two weeks)

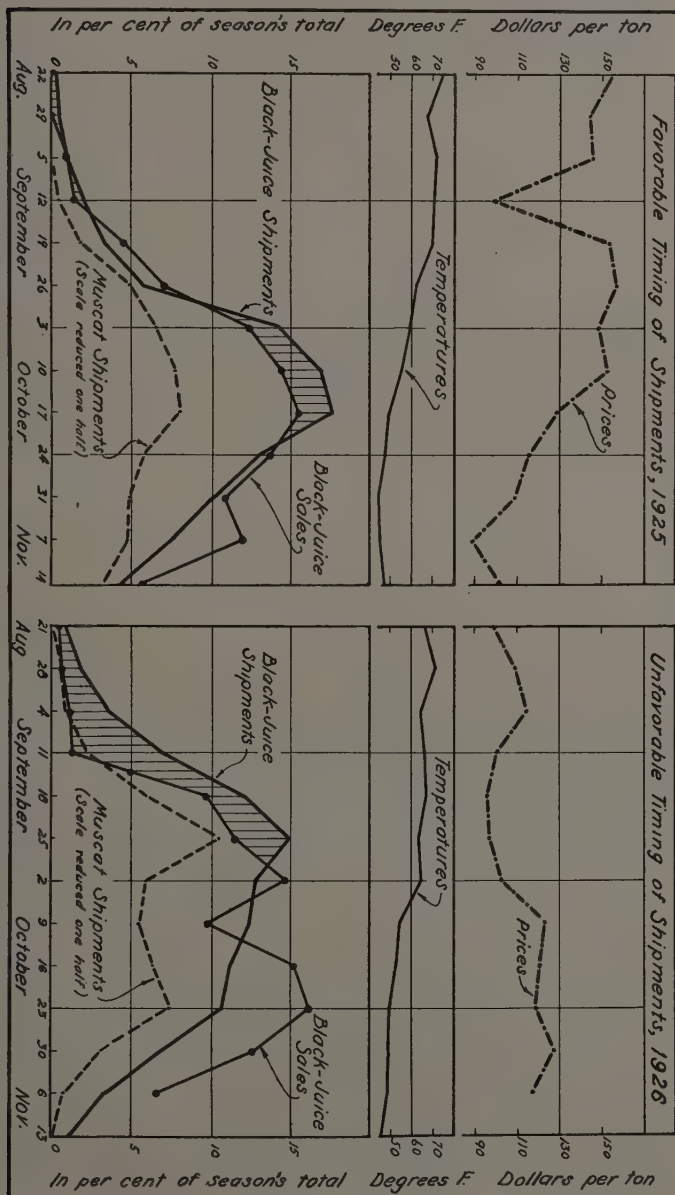


Fig. 4. The shaded areas indicate the lag between arrivals and sales in the first few weeks of each season. Data from tables 4 and 5.

Weekly New York Temperatures, Muscat Shipments and Black-Juice Shipments, Unloads and Prices, 1927 and 1928

(Shipments advanced two weeks)

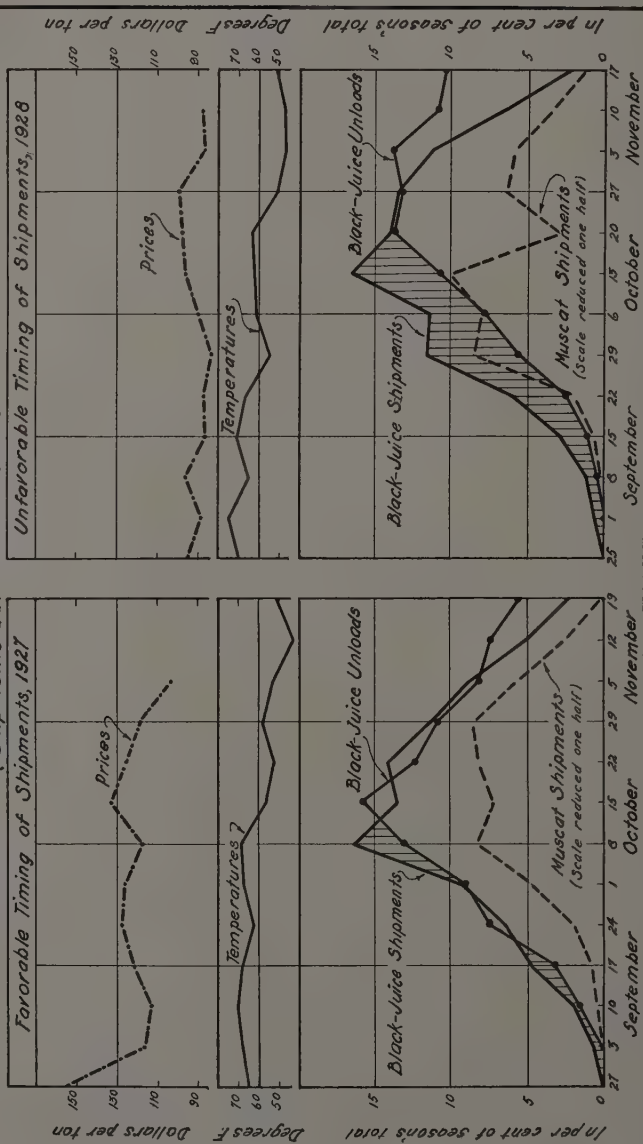


Fig. 5. The shaded areas indicate the lag between arrivals and sales in the first few weeks of each season. Data from tables 4 and 6.

On the other hand, in years like 1925 and 1927 in which heavy arrivals in eastern markets did not occur until about the time when temperature conditions were favorable for wine-making, consumers appear to have been in the market ready to move juice grapes into consumption at better prices than could be expected earlier. Shipments to eastern markets in these two years were delayed either because of late-maturing crops or because early shipments were held back by shipping organizations. In both 1925 and 1927, there was favorable timing of early shipments to demand, unloads coinciding closely with arrivals from California. Correspondingly, prices were above the average to be expected for the quantities shipped, judging from the regression line in figure 3. Prices in 1925, however, were not as well maintained as in 1927. The sharp price decline in the latter part of the 1925 season was largely due to very unfavorable weather conditions—early snow and heavy frosts. During 1927 there appears to have been an exceptional demand for juice grapes, the causes of which have not been entirely explained.

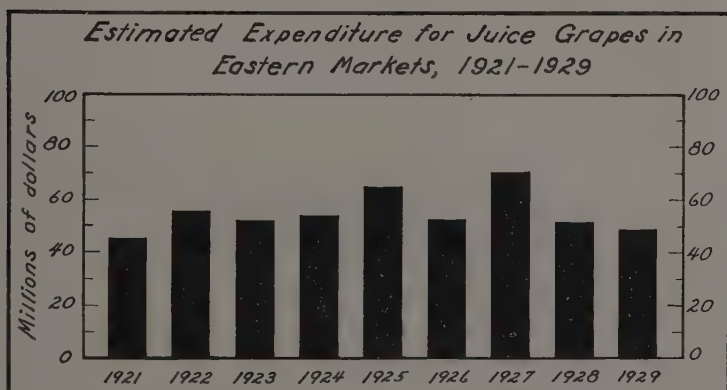


Fig. 6. Data based upon tables 3 and 7 and computed by adding the value of shipments of black-juice grapes, at their adjusted price, to the value of shipments of Muscats, at their adjusted price.

Perhaps the most important factor affecting black-juice grape prices remaining to be discussed is the volume and timing of fresh Muscat shipments. According to the trade, fresh Muscats have been extensively used in the East for blending with black-juice varieties, partly because they have been low priced and partly because many consider that they improve the color and taste of wine. Information from those acquainted with wine-making in the East indicates that

no set proportion of black and white juice is used in making a blend. When Muscat supplies are plentiful owing to heavy shipments early in the season, and their price more attractive to buyers than that of black-juice grapes, the proportion of Muscats used in blending is presumably increased.

The hypothesis that Muscats are used to hold down the aggregate cost of the wine made seems to be supported to some extent by figure 6, which gives the total outlay, based on New York auction prices, for all juice stock by years. With the exception of 1925 and 1927, the total outlay per season has remained fairly uniform, although a slight downward movement may be occurring. As black-juice grape prices have declined greatly since 1925 with increased shipments, apparently more of them have been substituted for Muscats.

Figures 4 and 5 enable one to see the relation between weekly Muscat shipments and black-juice prices, shipments, and unloads in four recent years. In 1925 and 1927, years when prices of black-juice grapes were most favorable, heavy Muscat shipments did not arrive in eastern markets before black-juice grapes were moving readily into consumption. Because shipments of Muscats were favorably timed to the demand for black-juice grapes they apparently did not tend to depress black-juice prices unduly. During the 1926 season, although black-juice shipments were not properly timed to demand, Muscat shipments arrived in the East after the demand for black-juice grapes had developed. Black-juice prices, therefore, were probably prevented from falling lower than they did. The season of 1928 illustrates the tendency for substantial arrivals of Muscats before the demand for wine-making had become well developed to add to the unfavorable conditions created by early shipments of black-juice grapes. The bulk of Muscat shipments in 1928 arrived in eastern markets before black-juice grapes were moving most freely into consumption, and thereby apparently depressed the price of both classes of grapes.

Quality of black-juice grapes has obviously had some influence upon their prices. In 1926 the good quality of black-juice grapes plus late Muscat shipments aided materially in preventing prices from remaining on a low level for the entire season. Since juice grapes are not used for direct table consumption, however, external appearance probably affects their prices less than it does table-grape prices.

TABLE 5
WEEKLY PRICES, AUCTION SALES, AND SHIPMENTS OF BLACK-JUICE GRAPES,
AND SHIPMENTS OF MUSCATS, 1925 AND 1926

Weeks ending (as of 1926)	Price, dollars per ton	Sales in 11 delivered- auction markets		Black-juice shipments		Muscat shipments	
		Number of packages	Per cent of season's total	Carloads	Per cent of season's total	Carloads	Per cent of season's total
1	2	3	4	5	6	7	
1925							
Season's total*	†	6,293,667	100.00	28,213	100.00	19,573	100.00
Aug. 7.....			0	81	0.27		
Aug. 14.....	168.00	1,000	0.02	87	0.35		
Aug. 21.....	155.20	13,656	0.20	261	0.92	19	0.10
Aug. 28.....	144.00	33,192	0.53	596	2.11	223	1.13
Sept. 4.....	145.60	56,792	0.90	970	3.43	733	3.74
Sept. 11.....	98.40	88,968	1.41	1,637	5.80	1,867	9.53
Sept. 18.....	153.60	288,019	4.58	4,066	14.40	2,611	13.33
Sept. 25.....	156.80	450,539	7.16	4,786	16.96	3,040	15.53
Oct. 2.....	148.80	786,519	12.50	5,057	17.92	3,157	16.12
Oct. 9.....	152.80	911,202	14.48	3,716	13.16	2,357	12.04
Oct. 16.....	129.60	974,648	15.49	2,825	10.01	1,943	9.92
Oct. 23.....	115.20	872,133	13.86	2,135	7.56	1,926	9.84
Oct. 30.....	108.80	690,100	10.96	1,373	4.86	1,334	6.81
Nov. 6.....	88.80	760,231	12.08	565	2.00	363	1.85
Nov. 13.....	101.60	366,668	5.83	63	0.21	*	*
1926							
Season's total*		5,897,241	100.00	27,882*	100.00*	11,198	100.00
Aug. 7.....	*	3,084	0.05	281	1.01	5	0.08
Aug. 14.....	91.20	15,280	0.26	530	1.90	138	1.23
Aug. 21.....	98.40	32,799	0.56	1,026	3.68	216	1.92
Aug. 28.....	109.60	36,296	0.62	1,936	6.95	505	4.50
Sept. 4.....	114.40	63,195	1.07	3,445	12.37	1,345	12.01
Sept. 11.....	100.80	78,808	1.34	4,178	14.98	2,368	21.14
Sept. 18.....	96.00	577,496	9.79	3,570	12.81	1,319	11.77
Sept. 25.....	96.80	676,241	11.47	3,506	12.57	1,251	11.17
Oct. 2.....	102.40	868,098	14.72	3,173	11.39	1,404	12.53
Oct. 9.....	123.20	576,287	9.77	2,988	10.73	1,662	14.84
Oct. 16.....	121.60	896,798	15.21	1,896	6.82	709	6.33
Oct. 23.....	118.40	932,062	16.14	912	3.28	163	1.45
Oct. 30.....	127.20	743,136	12.60	320	1.15	113	1.01
Nov. 6.....	117.60	377,631	6.40				

* Data for the period August 1 through November 13 are identical with the season's totals except in the case of black-juice shipments for 1926, which amounted to 27,781 cars for that period compared with the season's total of 27,882.

† Dashes indicate no data available or insufficient data.

Sources of data:

Col. 1: Simple or unweighted weekly average price for lugs of the chief black-juice varieties—Alicante Bouschet, Carignane, Zinfandel, Petite Sirah, Mission and Mataro—multiplied by 80 to convert to approximate price per ton. Data from reference 8, p. 23-46.

Col. 2: Weekly totals of sales of the varieties listed above on the eleven delivered-auction markets listed in footnote 6, page 103. Data from reference 8, p. 23-46.

Cols. 4 and 6: Include a few hundred cars of white-wine varieties in both 1925 and 1926. Data for 1925 from reference 1, p. 71 and for 1926 from reference 8, p. 75-76.

TABLE 6
WEEKLY SHIPMENTS OF BLACK-JUICE GRAPES AND UNLOADS AND PRICES IN NEW YORK AND WEEKLY MUSCAT SHIPMENTS, 1927-1929

Weeks ending (as of 1927)	Price, dollars per ton	Unloads of		Interstate shipments			
		black-juice grapes		Black-juice		Muscat	
		Carloads	Per cent of season's total	Carloads	Per cent of season's total	Carloads	Per cent of season's total
1927							
1	2	3	4	5	6	7	8
Season's total.....		8,069	100 00	29,140†	100 00†	15,216	100 00
Aug. 13.....				28	0.09		
Aug. 20.....				261	0.89	16	0.11
Aug. 27.....	155.20			748	2.56	149	0.97
Sept. 3.....	116.80	18	0.22	1,302	4.46	272	1.78
Sept. 10.....	113.60	131	1.62	1,909	6.55	640	4.21
Sept. 17.....	121.60	253	3.13	3,484	12.00	1,434	9.43
Sept. 24.....	127.20	612	7.58	4,752	16.30	2,628	17.28
Oct. 1.....	126.40	730	9.04	3,933	13.50	2,235	14.69
Oct. 8.....	118.40	1,058	13.11	4,282	14.70	2,533	16.65
Oct. 15.....	133.60	1,279	15.85	3,317	11.40	2,584	16.98
Oct. 22.....	126.40	996	12.34	2,601	8.92	1,741	11.44
Oct. 29.....	118.40	827	10.24	1,493	5.12	747	4.91
Nov. 5.....	104.80	682	8.20	691	2.37	143	0.93
Nov. 12.....		618	7.65	245	0.84	83	0.55
Nov. 19.....		456	5.65	78	0.27	5	0.03
1928							
	9	10	11	12	13	14	15
Season's total.....		5,664	100 00	26,048†	100 00†	14,170	100 00
Aug. 13.....	79.20	2	0.04	37	0.14		
Aug. 20.....	97.60	3	0.05	197	0.76	14	0.10
Aug. 27.....	94.40	11	0.19	339	1.30	56	0.39
Sept. 3.....	88.80	22	0.38	775	2.97	201	1.42
Sept. 10.....	96.00	27	0.47	1,586	6.08	596	4.21
Sept. 17.....	86.40	62	1.09	3,031	11.63	2,441	17.23
Sept. 24.....	87.20	143	2.52	3,023	11.60	2,238	15.79
Oct. 1.....	84.00	315	5.56	4,333	16.63	2,872	20.27
Oct. 8.....	90.40	440	7.76	3,650	14.01	837	5.91
Oct. 15.....	96.80	668	11.79	3,541	13.59	1,832	12.93
Oct. 22.....	98.40	780	13.78	2,972	11.40	1,667	11.77
Oct. 29.....	99.20	757	13.37	1,729	6.63	1,009	7.12
Nov. 15.....	87.20	789	13.94	642	2.46	347	2.44
Nov. 12.....	88.00	621	10.97	115	0.44	47	0.33
Nov. 19.....		573	10.11	26	0.09	9	0.06
1929							
	16	17	18	19	20	21	22
Season's total.....		7,632	100 00	24,294†	100 00†	8,855	100 00
Aug. 13.....				7	0.02		
Aug. 20.....		2	0.02	149	0.61	4	0.04
Aug. 27.....	135.20	17	0.22	412	1.69	19	0.21
Sept. 3.....	132.80	20	0.26	837	3.44	27	0.30
Sept. 10.....	99.20	54	0.71	1,625	6.68	264	2.98
Sept. 17.....	103.20	104	1.36	2,548	10.49	829	9.36
Sept. 24.....	106.40	254	3.32	4,094	16.86	2,295	25.92
Oct. 1.....	104.80	421	5.52	3,724	15.33	1,592	17.98
Oct. 8.....	90.40	614	8.05	2,666	10.98	1,390	15.70
Oct. 15.....	103.20	1,139	14.93	3,272	13.46	1,207	13.64
Oct. 22.....	113.60	1,099	14.39	2,747	11.31	761	8.60
Oct. 29.....	107.20	1,094	14.34	1,678	6.91	316	3.57
Nov. 5.....	102.40	1,064	13.95	455	1.87	107	1.21
Nov. 12.....		859	11.25	80	0.33	43	0.47

* Dashes indicate no data available or insufficient data.

† Prior to August 7 only one car of black-juice grapes was shipped in 1927, only 21 cars in 1928, and none in 1929. In all other cases the difference between the season's total and the total from August 7 to November 19 are figures for the season after November 19.

Sources of data:

Cols. 2, 9, and 16: True or weighted average New York delivered-auction prices per lug of chief black-juice varieties—Alicante Bouschet, Zinfandel, Carignane, Petite Sirah, Mission and Mataro—multiplied by 80 to convert to price per ton. Data for 1927 from reference 2, p. 75-79; for 1928 from reference 9, p. 47-48, and for 1929 compiled from reference 7, supplemented by reference 4.

Cols. 3, 10, and 17: Unloads in New York and Jersey City compiled from daily Market News on Grapes issued by U. S. Dept. Agr. Bur. Agr. Econ. from Fresno. See reference 7, for 1929.

Cols. 5 and 7: Compiled from reference 2, p. 80-88.

Cols. 12, 14, 19, and 21: Compiled from references 3 and 4.

Undoubtedly, there are other factors which have influenced the price of black-juice grapes, such as strikes (e.g., the truckmen's strike in New York City in 1929), racketeering, trends in prohibition enforcement, and psychological peculiarities of purchasers in eastern juice markets. Some of these factors are unpredictable, but no doubt they have had considerable influence on black-juice grape prices at times.

MUSCATS

In pre-war days most California Muscats were dried and very few were shipped fresh to eastern markets. Since the War, however, in response to eastern demand for juice grapes and because of decreased demand for Muscat raisins, California shipments of fresh Muscats increased very rapidly. Table 7 shows that only 3,300 cars were shipped in 1921, as compared with the peak of 19,300 carloads in 1925. Since 1925, Muscat shipments from year to year have fluctuated greatly with no trend particularly evident. However the plentifulness of black-juice grapes may be sufficient to restrict Muscat shipments in the future.

Although a few fresh Muscats are sold as table stock, a very large majority are utilized for juice purposes. During the years covered in this study, Muscats alone have comprised some 80 per cent of the total shipments of California white-juice grapes, and shipments and prices of this one variety are believed to be fairly representative of white-juice grapes as a class.

Figure 7 shows that fresh Muscat shipments have apparently been the chief factor affecting eastern prices of this variety, but it also indicates that changes in demand have had an important influence on prices. The regression curve indicates that the demand for fresh Muscat grapes is very elastic. Hence the total sales value of these grapes normally is much greater for heavy shipments than for light. This is quite in contrast with the somewhat inelastic demand for table and black-juice grapes (see pages 104 and 111) and the very inelastic domestic demand for raisins.¹³ The elasticity of demand indicated by the curve in figure 7 varies from about 2.0 with shipments of 8,000 to 10,000 carloads of Muscats to about 1.4 with shipments of 15,000 carloads or somewhat less. Demand is most elastic when shipments are small and prices high. The very elastic demand for fresh Muscats may be partly accounted for by the fact that a majority of eastern

¹³ See accompanying paper: Shear, S. W. and R. M. Howe. Factors affecting California raisin sales and prices, 1922-1929, *Hilgardia* 6:78. 1931.

juice-stock buyers probably prefer black-juice grapes if the price is relatively low compared with Muscat prices, which has been the case normally in recent years with heavy shipments of black-juice grapes. In addition the regression curve in figure 7 suggests that there may be enough buyers who prefer Muscat wine or blends with black-juice so that they are willing to buy 8,000 to 12,000 carloads at moderate prices even when black-juice grapes are about the same price.

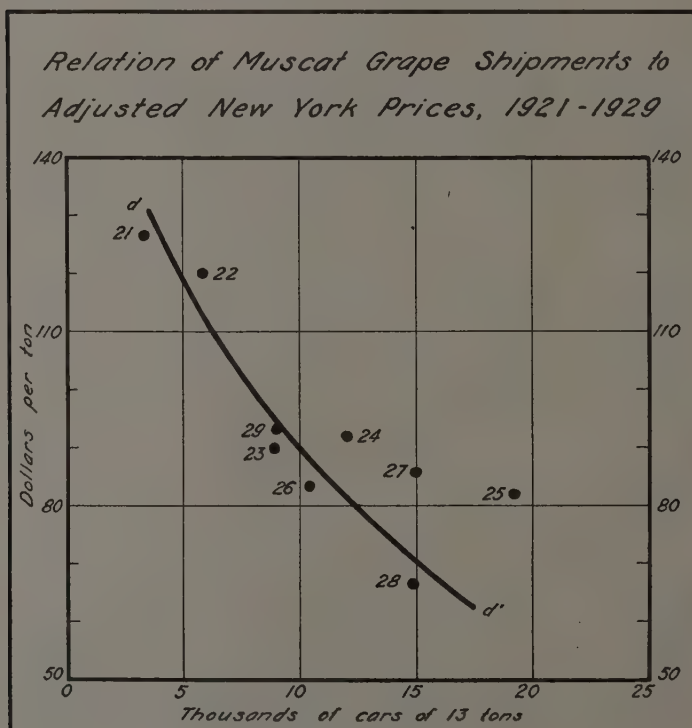


Fig. 7. Data from table 7.

Because Muscat grapes are mostly utilized for wine-making by eastern buyers, one would logically expect to find changes in demand similar to those for black-juice grapes. Comparison of figures 3 and 7 establishes this presumption as a fact. There have been very evident and significant similarities in changes in the demand for these two classes of juice grapes in recent years. Figures 3 and 7 both indicate

that there was a much greater demand for juice grapes in 1925 than in 1926. Almost identically the same quantities of black-juice grapes were sold in 1925 as in 1926 but at an average of \$10 more a ton than in 1926. On the other hand fresh Muscats averaged almost the same price in 1925 as in 1926 although shipments in 1925 were nearly double those in 1926.

Prices of black-juice grapes in 1927, a year of exceptionally heavy demand for juice stock, averaged approximately \$30 a ton above the prices received for 1928 shipments, which lacked only about 2,000 cars of being as large as 1927 shipments. A strikingly similar situation prevailed for fresh Muscats. Although practically the same number of carloads of fresh Muscats were shipped in both of these years, their price in 1927 averaged nearly \$20 a ton above the average of 1928.

Figure 7 also brings out the fact that the demand for fresh Muscats in 1924 was noticeably better than in 1923, since substantially more Muscats were shipped in 1924 at a slightly higher price than in 1923. It is also evident that eastern demand for fresh Muscats was about the same in 1929 as in 1923 and considerably less than in 1924, 1925, and 1927. The demand for black-juice grapes was also poor in 1929. However, it may not have been much poorer than the level of demand that some well-informed men in the juice-grape marketing business fear may prevail during the next few years. Preliminary data indicate that the demand for black-juice grapes in 1930 was just about the same as in 1928 and in 1929, while the demand for fresh Muscats in 1930 appears to have been noticeably better than in 1929, perhaps because Muscat shipments were so small compared with black-juice grapes.¹⁴

The most important factors other than shipments that appear to account largely for the price residuals from the regression curve in figure 7 are, (1) timing of Muscat shipments to demand, (2) the quantity ratio between black-juice grapes and Muscat shipments, (3) the quality, and (4) the general price level. The discussion of the influence of similar factors on black-juice grape prices (see pages 113-118) in general applies so well to fresh Muscat shipments, that further discussion of these factors has been omitted here except as regards the relation of temperatures in eastern markets to the demand for fresh Muscats.

¹⁴ Preliminary data indicate that about 29,200 carloads of California black-juice grapes were shipped in 1930, the average New York delivered-auction price being about \$89 a ton actual or \$103 adjusted. About 8,700 carloads of Muscats moved at a price of about \$88 a ton actual or \$102 adjusted.

Temperature appears to have greatly influenced the sale and movement into consumption of fresh Muscats in eastern markets in the same way as in the case of black-juice grapes. Muscats do not usually bring a favorable price until favorable temperatures prevail. Not until mean temperatures in New York City have remained between 50° and 60° F for a week to ten days, have a great many Muscats been sold, and when heavy shipments of Muscats have arrived in eastern markets much before favorable temperatures occur, as in 1928, prices have suffered. On the other hand, in years when Muscats have reached eastern markets after favorable temperatures had prevailed and black-juice grapes had started to move readily into consumption, their price was considerably higher.

TABLE 7

ANNUAL SHIPMENTS AND ACTUAL AND ADJUSTED NEW YORK DELIVERED-AUCTION PRICES OF CALIFORNIA MUSCAT GRAPES, 1921-1929

Crop year	California shipments	Price per ton	
		Unadjusted	Adjusted
	1	2	3
	<i>carloads</i>	<i>dollars</i>	<i>dollars</i>
1921.....	3,300	123.20	126.22
1922.....	5,800	116.00	119.95
1923.....	8,900	90.40	89.86
1924.....	12,000	90.40	92.15
1925.....	19,300	85.60	82.70
1926.....	10,300	83.20	83.20
1927.....	15,000	81.60	85.53
1928.....	14,900	65.00	66.53
1929.....	9,000	89.60	92.85

Sources of data:

Col. 1: Total shipments to the nearest hundred, both inter and intrastate, in carloads approximately 13 tons net. Data for 1928 and 1929 increased 6 per cent to allow for heavier loadings per car. Source of data indicated in footnote 1, table 1, page 106.

Col. 2: Weighted average prices for New York delivered-auction sales. Source of data indicated in footnote 2, table 1, page 106.

Col. 3: Prices adjusted to 1926 level by Bureau of Labor Statistics all-commodity index of wholesale prices for calendar years.

Most of the California Muscat vineyards were originally planted for raisin production, and before the War fresh shipments took only a small part of the crop. The percentage of the total production of Muscat grapes shipped fresh, however, rose rapidly after the War from about 5 per cent in 1921 to a peak of approximately 70 per cent in 1925. In 1928 it was 60 per cent but in other recent years it has varied from about 40 to 45 per cent.

Obviously many growers have been exercising the option of either drying their Muscats or of selling them to the fresh grape market. As a result, in recent years when prevailing prices and advances for raisins were small compared with expected returns from fresh shipments, fresh Muscat shipments have been large, as in 1927 and 1928. On the other hand, when the price of the dried product has appeared relatively more favorable, more have been dried and fewer carloads have been shipped fresh.

TABLE 8
OPENING PRICES OF FRESH AND DRIED MUSCAT GRAPES

Crop year	Fresh Muscats, opening price, dollars per ton	Muscat raisins, cents per pound
	1	2
1921	*	16.7
1922	*	10.3
1923	77	7.5
1924	67	6.3
1925	90	6.3
1926	85	7.0
1927	81	6.6
1928	59	4.4
1929	98	6.5

* Adequate data not available.

Sources of data:

Col. 1: Simple or unweighted arithmetic average of sales of lugs during the first three weeks of each season in the eleven delivered-auction markets multiplied by 80 to convert to price per ton. The eleven delivered-auction market quotations for Muscats were selected in preference to the New York delivered-auction quotations in order to obtain an earlier average opening price. Data from reference 12, p. 26; reference 2, p. 68; and reference 10, p. 42.

Col. 2: Simple or unweighted average of the July, August, September, and October quotations for 25-pound Sun-Maid Puffed Bakery type. Compiled from data made available by the Sun-Maid Association.

Figure 8 shows graphically how this tendency has worked out in the past. The upper scatter depicts the relation between the opening price of raisins and the opening price of fresh Muscats in the eleven eastern delivered-auction markets. There has been a tendency, as the scatter indicates, for the prices prevailing for the two different kinds of uses to strike at some equality. However, when the residuals from the curve in the upper figure were plotted against fresh-Muscat shipments, it was found that in years in which the opening price for raisins was low with respect to the prevailing prices for fresh Muscats in eastern markets, more Muscats were shipped fresh, and vice versa.

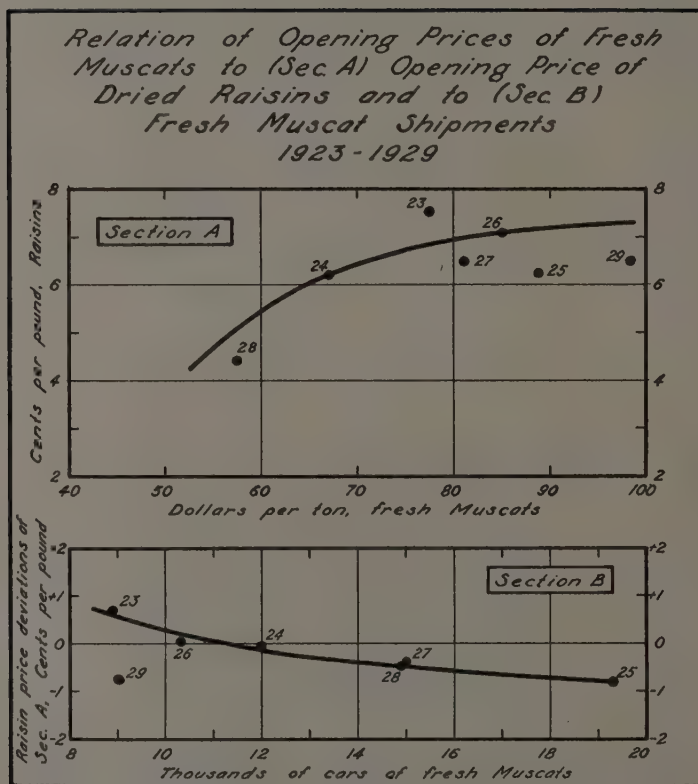


Fig. 8. Data from tables 7 and 8.

Although the 1929 season appears to be an exception to this explanation in reality it is not, for, from the second week in September to the second week in October many Muscats were dried instead of shipped fresh because of the promise unfulfilled, of a bonus of 1 cent a pound on Muscat raisins offered by the Grape Stabilization Board¹⁵ to reduce fresh Muscat shipments and thereby lessen competition with black-juice grapes in eastern markets. Naturally, more Muscats were dried and fewer shipped fresh than would otherwise have been the case. Only about 9,000 cars of fresh Muscats were shipped as compared with 15,000 in 1928, and prices secured in eastern markets were relatively higher than those received for the Muscats dried. Only about 45 per cent of California Muscat grape production was shipped fresh in 1929 compared with over 60 per cent in 1928.

SUMMARY

Similar, somewhat related, but slightly different factors account for changes in the annual average prices of each class of California grapes in eastern markets during the years 1921 through 1929. The chief factor determining the annual average adjusted price of each class of grapes—table, black-juice, and white-juice—has been the season's total shipments. Shipments for the season have been much more influential in determining the season's average price in the case of table grapes, however, than in the cases of black-juice grapes and of Muscats. This seems to be primarily because shipments of table grapes have been better timed to meet the current needs of eastern markets than have those of juice grapes.

¹⁵ In the third week of August, 1929, the Federal Farm Board announced that it was taking part in a financing program whereby credit from the Farm Board and California banks amounting to 9 million dollars would be made available to Sun-Maid to be used for advances on the basis of 3 cents a pound for both Thompsons and Muscats to raisin growers who belonged to or pooled with Sun-Maid. In the second week of September, 1929, the Grape Stabilization Corporation announced that it would provide an additional advance of 1 cent a pound on Muscat raisins to this same group of growers. This one-cent bonus was designed to increase the quantity of Muscats dried and thereby decrease fresh Muscat shipments, thus reducing competition with black-juice grapes which have no alternative use other than as juice grapes. Presumably it was to be secured from assessments upon shipments of black-juice grapes, the class of grapes to be benefited most.

After getting many Muscat growers to dry their grapes by offering them this extra cent a pound, in the second week of October, 1929, the Grape Stabilization Corporation announced that it did not have the money to meet its agreement and hence the bonus could not be paid. (See California Fruit News 80 (2146) p. 3 and 6, Aug. 24, 1929; 80 (2149) p. 3, Sept. 14, 1929; and 80, (2153) p. 3 and 6, October 12, 1929).

The demand for black-juice grapes and for table grapes at the quantities marketed in recent years has been somewhat inelastic, although not nearly so inelastic as that for raisins.¹⁶ The demand for fresh-Muscat grapes has been rather elastic.

The demand for table grapes does not change so much during the season as the demand for juice grapes, which apparently depends to a large extent upon temperatures favorable to the making of good wine. The bulk of sales of juice grapes, both black and white, in eastern markets has generally occurred during the month of October after mean temperatures of 50° to 60° F have prevailed for a week or ten days. In years in which black-juice grapes and Muscats arrived in eastern markets in considerable volume a week or two before proper temperatures prevailed and active buying began, prices started at a lower level and averaged less for the whole season than in years with comparable total shipments in which substantial arrivals were delayed until active demand for juice grapes prevailed.

The uses for the bulk of table and juice varieties are so dissimilar that shipments of juice grapes were found to have no measurable effect on table-grape prices, and apparently table grapes have little influence on juice-grape prices, except insofar as any considerable tonnage of a table variety like Malagas are diverted into juice-grape channels. However, shipments of eastern *labrusca* grapes, the majority of which are probably used for table purposes, were found to affect the price of California table grapes to a minor extent.

Though there can be no doubt that quality has a substantial effect upon the eastern price of California grapes, lack of appropriate data have unfortunately precluded statistical measurement of its influence.

Because Muscat grapes are mostly utilized for wine-making by eastern buyers, there have been very evident and significant similarities in changes in the demand for black-juice grapes in recent years. Fresh Muscats have been extensively used in the East for blending with black-juice varieties and therefore these two classes of grapes appear to have both a complementary and a competitive relation to one another. Apparently there is a tendency to increase the proportion of whichever class of juice grapes is relatively the cheaper. Owing to the large increase in black-juice shipments, they have been relatively cheaper than Muscats, and apparently, therefore, a larger proportion of blends have been made from black-juice grapes in recent years. Partly as a result of variations in blending due to changes in

¹⁶ See accompanying paper: Shear, S. W., and R. M. Howe. Factors affecting California raisin sales and prices, 1922-1929. *Hilgardia* 6:73-100. 1931.

relative prices, consumer annual outlays for juice stock have remained fairly uniform during the past nine years.

Fresh Muscat shipments, and hence prices, naturally are influenced by prevailing prices and expected advances for Muscat raisins at shipping time. As a result, in recent years in which prevailing prices and expected advances for raisins have been small compared with expected or prevailing returns from fresh shipments, the fresh-Muscat movement has usually been relatively large. On the other hand, when the raisin-price outlook appeared favorable, fresh-Muscat shipments have normally been curtailed and more dried for raisins.

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